evaluation and space programming methodology series

17

inpatient nursing

- medical/surgical
- pediatric
- psychiatric
- obstetrical
- newborn nurseries

december, 1981

Health and Welfare Canada Santé et Bien-être social Canada

IMPORTANT:

1. Read this methodology in its entirety before attempting to use it in actual space programming. This methodology greatly simplifies the process of generating reliable space programs for this department. However, the process is still complex and requires a thorough understanding if it is to be correctly performed.

2. Space dimensions and productivity levels used in this methodology represent guidelines. Actual conditions among different geographic areas may provide reason for the noted guidelines to vary.

3. Space dimensions and productivity levels used in this methodology may change over time with changes in technology and medical practice. The guidelines in this methodology may be considered valid as of the publishing date.

4. Productivity levels used in this methodology reflect ranges typically found in hospitals. The productivity levels involve hours per day of operation, time per procedure, and procedure capacity per room per year. Certain small hospitals performing less complex cases may experience higher potential productivity levels while large teaching institutions may experience lower productivity levels reflecting the additional time per procedure consumed by teaching activities.

EVALUATION AND SPACE PROGRAMMING METHODOLOGY

FOR

INPATIENT NURSING

- MEDICAL/SURGICAL
- PEDIATRIC
- PSYCHIATRIC
- OBSTETRICAL
- NEWBORN NURSERIES

DECEMBER, 1981

HEALTH SERVICES AND PROMOTION BRANCH

DEPARTMENT OF NATIONAL HEALTH AND WELFARE

PUBLISHED BY AUTHORITY OF

THE MINISTER OF NATIONAL HEALTH AND WELFARE

FOREWORD

This document was produced under the direction of the Health Facilities Design Division. It responds to the needs expressed by provincial members of the Subcommittee on Health Facilities Planning and Construction of the Federal-Provincial Advisory Committee on Institutional and Medical Services. They requested that a series of evaluation and programming methodologies be prepared with the objectives of optimizing design and costs. The methodology is applicable for generating detailed room-by-room space programs for inpatient nursing units, developing gross space estimates on a departmental basis, and for evaluating proposed projects.

The Advisory Committee on Institutional and Medical Services approved this methodology on October 7, 1981. The Committee recommended that the methodology be published in both French and English, and issued to provincial ministries for distribution. It was further recommended that the methodology be distributed to federal authorities engaged in health facilities planning and construction, and to appropriate national and international organizations.

The document was prepared by Chi Systems, Inc. Ann Arbor, Michigan. Acknowledgement is made of the valuable contributions of each member of the Subcommittee on Health Facilities Planning and Construction, and of those individual, provincial, federal, private consultant, and Canadian hospital authorities and staff who contributed to the development of the methodologies. The members of the special task force for this work are as follows:

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introduction

INTRODUCTION

OBJECTIVE

The objective of this document is to present a methodology and criteria to evaluate and program space for the medical/surgical, pediatric, psychiatric, and obstetrical inpatient nursing units and newborn nurseries. The methodology assumes that a detailed functional program has been developed and is readily available, although some aspects of the functional program are discussed in this manual as they relate specifically to space requirements.

The application of this methodology will have the greatest pragmatic effect through ultimately involving the talents and expertise of the several disciplines of the design team, including department staff, hospital management, programming consultant, architect, and engineer. With a multidisciplinary approach, the programming task should be completed in an effective manner.

PROCESS AND NUMBERS

The following space programming methodology has two components which are separable:

- Process, which presents the logic of how space is programmed for a specific department. This deals with the way the workload is divided, the different departmental characteristics which require space, and the methods of calculation.

- Numbers, which convert workload and other data into specific space requirements in terms of square meters (feet). These numbers are used to estimate hours of productive time per day, average service time per workload unit, number of work stations, square meter (foot) sizes of rooms, and net to gross conversion ratios.

Both the process and numbers are required to arrive at a final space program. However, the specific numbers must be scrutinized depending upon the situation. A province may wish to modify the numbers based on local conditions. Also, future changes in medical programs will change space requirements, and consequently the numbers. The process, on the other hand, will be more stable.

Several programmatic and productivity issues affect the numbers in the methodology. Some examples are listed below:

- Hours per day of operation. The same facilities may be used 4, 6, 8, 12 or some other number of hours per day. The space requirements will vary dramatically with this policy.

Inpatient nursing units normally function 24 hours per day, but may provide some services only part of the day (e.g., surgical recovery).

- Days per week or days per year of operation. The number of days per week or year that a facility operates will also affect the space requirements. Normally inpatient nursing units operate every day of the year, unless there are no patients.

- Equipment. The types and sizes of equipment components directly affect the amount of space required to provide various services.

- Productivity. Personnel productivity and other related factors can affect the amount of staff support space required.

Reasonable values of productivity and typical hours of operation have been used in the methodology to develop space guidelines.

RELATIONSHIP TO PLANNING PROCESS

Health facilities are only one of the several resources used to provide health care services to a population. Hence, programming space for health facilities is part of a larger planning process, and follows several other activities in that process.

A simplified health facility planning process is illustrated in Figure 1, which will be briefly described. Planning for health facilities begins with planning for the health service needs of the population, then proceeds to facility and other resource requirements.

POLICY AND PLANNING FRAMEWORK

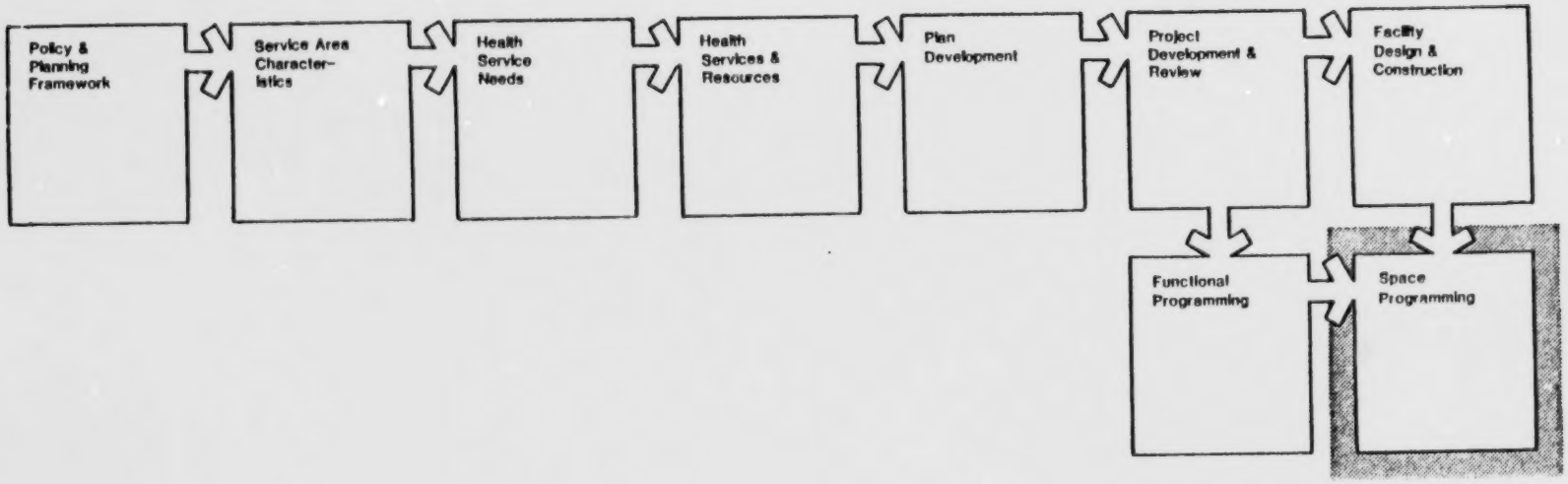
The planning process begins with a consideration of the policies which affect health care. These policies may be provincial or federal in nature. The planning framework is a description of the political and organizational environment in which the planning occurs. For example, there may be a strong governmental effort to control costs which includes limitations on specific types of facilities, equipment, manpower, or finances. The planning framework also addresses the people who will be preparing the plan, and how they are organized.

SERVICE AREA CHARACTERISTICS

These include the demographic and socioeconomic characteristics of a population, and the physical characteristics of the area in which they live. One objective is to determine where people obtain different kinds of health services, by what means, and how far they travel to do so. The description also includes future projected changes in geography, population, industry, etc.

FIGURE 1

HEALTH FACILITY PLANNING PROCESS



HEALTH SERVICE NEEDS

The needs for health services are estimated before resources to provide these services can be estimated. Health service needs can be estimated using current utilization rates, future population estimates, and factors which modify future need for health services. Example modifying factors are:

- Changes to improve health status
- Changes to reduce over-utilization
- Changes to satisfy unmet needs
- Statistical trends

If political or natural borders affect the data, then adjustments must be made for in- and out-migration.

HEALTH SERVICES AND RESOURCES

Once needs have been established for an area, the next step is to determine what services exist and their physical capacity at reasonable rates of use. The objective is to obtain an inventory of resources in the same terms as the inventory of estimated needs. The problem is to obtain data in sufficient detail but not to become overburdened by irrelevant information.

PLAN DEVELOPMENT

This is the stage in the planning process at which the inventory of service equivalent needs and the inventory of existing capacity are matched and an action plan prepared. The match is based on: quantity, location, quality, and cost. Investigation of the costs and benefits of alternative service configurations (i.e., of alternate methods of organizing, financing, staffing, and delivering services), and of their best settings and optimum sizes is an essential part of plan development. The process will result in plans for all health care resources, including facilities, equipment, manpower, finances, and supplies. These plans may result in changes to facilities requiring detailed functional planning and space programming.

PROJECT DEVELOPMENT AND REVIEW

The plans for an institution or a geographic area will involve numerous changes, some of which will result in projects to change health care facilities. Such projects for facility changes may be

identified by provincial staff or provider institutions. Implementation of these projects involves activities of two types:

- Descriptions of facility requirements and changes to support the medical care programs. This is the input to functional and space programming.
- Activities to support the project development and review, such as selection of architects and consultants, preparation of documents for review agencies, development of funding sources, and presentations and attendance at review meetings. These activities are direct inputs to the design and construction phase.

FUNCTIONAL PROGRAMMING

This is the process by which an identified service or defined level of patient utilization (workload) is evaluated to determine the most desirable method of fulfilling medical program objectives. The end product is a functional program which is a description of the objectives and operational concepts of a particular service, as well as the numbers and categories of people, systems, and equipment necessary to perform that service at a projected workload level. Narrative and/or graphic descriptions of intradepartmental and interdepartmental relationships, circulation, and methods for obtaining flexibility and expansibility are also included in the functional program.

SPACE PROGRAMMING

This is the process by which a functional program is translated into facility space requirements, which will provide the basis for architectural design, building construction, and occupancy. The end product of this is a space program which tabulates every room or area for the department, the required number of net square meters (feet) of space needed for that function, the departmental gross space requirement, and special design characteristics. These room-by-room net space requirements and departmental gross space requirements are inputs to the design process.

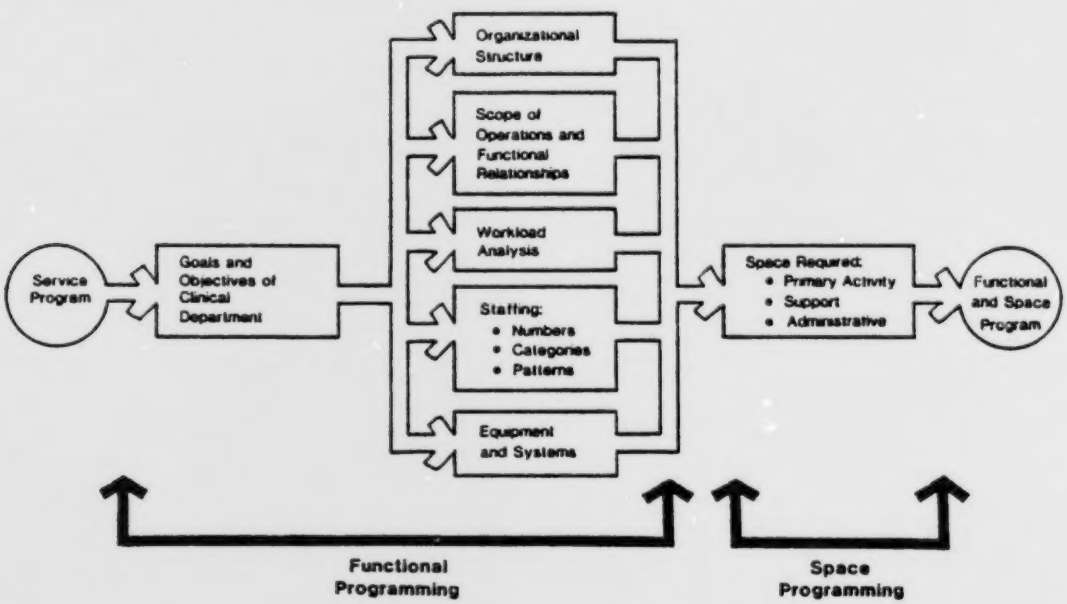
FACILITY DESIGN AND CONSTRUCTION

Design of the facility then proceeds within the guidelines established by the functional program and the space program. The objective is to develop a design that will meet the functional and space requirements as well as possible. Construction follows design and is based on the contract documents.

RELATIONSHIP TO FUNCTIONAL PROGRAMMING

As mentioned previously, this space programming methodology assumes that a detailed functional program is available. Because of the way in which space programming and functional programming interrelate, it is difficult to totally separate the two. Some aspects of the functional program are discussed in this methodology as they relate specifically to space requirements.

The functional and space programming process is illustrated in the figure below.



RELATIONSHIP TO DESIGN

Design also can have an impact on the final space requirements. For example, selecting specific dimensions for a facility may result in some departments having more or less space than that developed in the space program. Also, existing building constraints will affect the space requirements when designing for renovations. The space program is intended to represent the actual space requirements, which are inputs to the design process. However, during design, compromises often result.

INTERPRETATION OF GUIDELINES

The space estimates generated by this methodology are guidelines. The intention is that the estimates be used as guidelines, with judgment used to evaluate changes in the numbers and differences between hospital proposals and the space program projected by the methodology.

Several references, provided at the end of this document, relate to the process and numbers in this methodology. The references may be useful as supplementary information.

The most likely causes for changes in the numbers in the methodology are future changes in medical practice, management, and technology. Users of the methodology should take these factors into consideration.

USE OF METHODOLOGY

This space programming methodology has several uses, but the two most important ones are:

- Evaluation of space requirements of existing or proposed facilities. This evaluation may be done by governmental staff, hospital staff, consultants, architects, or others.
- Planning for hospital departments. Estimated future workloads can be used to plan the space requirements of the respective departments. This planning may be done by governmental staff, hospital staff, consultants, and architects.

space programming scope

SPACE PROGRAMMING SCOPE

DESCRIPTION

General acute care nursing units are designed, staffed, and equipped to provide care for all patients except for those who are severely ill and require the specialized treatment and maximum surveillance afforded by a special care unit.* This manual addresses the space requirements of the six types of units listed below which extend across the health-illness continuum from health (childbirth and newborn) through death (terminally ill patients).

- Medical nursing units provide nursing care to patients undergoing medical diagnostic, therapeutic, and rehabilitative regimens.
- Surgical nursing units provide nursing care to patients undergoing surgery for diagnostic, therapeutic, and rehabilitative purposes.
- Pediatric nursing units provide nursing care to children, generally newborn through age eighteen, who are undergoing medical and/or surgical interventions.
- Psychiatric nursing units provide a therapeutic environment for patients diagnosed as having psychiatric illnesses. The treatment program includes the services of the psychiatric medical staff, specialized nursing staff, and professionally recognized interdisciplinary personnel (e.g., psychology, social services, activity therapy).
- Obstetrical nursing units provide care for post-partum patients as well as antenatal patients whose condition warrants close observation and/or therapeutic intervention.
- Newborn nurseries provide care to newborn infants during the postnatal period.

Nursing care includes assessment and observation, sustainative care (i.e., feeding and bathing), and minimal therapeutic intervention. Depending upon such factors as hospital size, patient demand, and area medical practice, care may be administered through specially designed medical, surgical, pediatric, obstetrical or newborn units or through a grouping of related areas: medical/surgical, medical/surgical including pediatrics, and maternal/child (obstetric and newborn).

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*"Special Care Units (#15)," Evaluation and Space Programming Methodology Series, June, 1979.

PROGRAMMATIC CONSIDERATIONS

All philosophical and operational concepts pertaining to patient care on each nursing unit should be clearly documented in an approved functional program. A number of key questions which should have been answered before beginning space programming are listed below. If any of these questions have not been previously discussed and the alternatives weighed and decisions documented, then the functional program should be revised before applying this methodology.

Key questions that relate to space programming decisions in general, are:

- How will the nursing care be organized (case, functional, team, primary, or modular nursing)?
- What is the nursing service organization structure of the institution (centralized versus decentralized)? Will there be head nurses, supervisors, patient care coordinators, etc.?
- Have measures been instituted to provide for the inservice educational needs of the nursing and ancillary personnel who will staff these units?
- Are nursing stations planned or will the units be organized around the "no-nursing station" concept? If there is to be a nursing station, how many beds will it serve?
- Will the nursing units be organized into specialized units following physician subspecialties (i.e., orthopedics, neurology, urology, etc.)? Will facilities for patients requiring isolation be provided?
- Will the nursing units be organized by level of care (i.e., self care, minimal, moderate, etc.)?
- How will physician coverage be implemented (i.e., daily, during the off shifts, and in emergent situations)? Will nursing personnel operate under any "standing orders" for emergent situations? Responsibilities for all staff members during normal and emergent situations must be clearly defined.
- Are special care units available within the hospital or within the immediate community to provide maximum surveillance and treatment of severely ill patients? Have criteria been established to govern the transfer of patients to/from these units?
- Where will terminally ill patients be cared for (i.e., within the hospital and/or the community)?
- What materiel movement/supply distribution systems will be utilized?

- Have patient transport and other relationships been established with the surgical suite, radiology department, and other key areas?

- What policies have been developed to guide the relationship between nursing staff on the units and support departments (i.e., housekeeping, dietary, social services, etc.)?

- How will educational and research activities impact on the nursing units?

Key questions that relate specifically to pediatric units are:

- Will parents be allowed to remain with their children as long as they wish, including overnight? If so, what provisions have been made for their sleeping, hygenic needs, meals, etc.?

- Will the pediatric unit be organized by age groupings (i.e., infants, toddlers, school age, adolescents)?

- What provisions have been made for the care of the critically-ill child?

- Will certain areas be designated for contaminated (infected) pediatric patients and/or patients with communicable diseases?

- What provisions have been made for school-age children to continue their studies during a lengthy hospitalization?

- What policies have been formulated to govern visitation by those other than parents (i.e., grandparents, siblings, friends)?

Key questions that relate specifically to psychiatric units are:

- Has the general philosophy and orientation of the psychiatric services been determined? Will both outpatient and inpatient services be provided? What types of patients will be treated? Will the unit be secured?

- Have criteria for admission to the psychiatric nursing unit been established?

- How will the psychiatric unit relate to occupational therapy, psychiatric social services, and other key areas?

- With what other institutions and community resources will the psychiatric nursing unit be affiliated? Where will long-term psychiatric patients be cared for (i.e., within the hospital and/or other institutions)?

Key questions that relate specifically to obstetrical units and newborn nurseries are:

- Will the obstetrical and newborn nursing units be located near the labor and delivery suite to facilitate transportation of the mother and neonate?
- To what extent is the focus of care family centered? What policies have been developed to facilitate the inclusion of the father?
- Will staff assignments include the maternal/child dyad or will there be separate staff designated to care for post-partum patients and newborn infants?
- What will be the scope of the educational program for post-partum patients and families? Will there be individual instruction, group classes, or both?
- Have policies been developed and/or provisions made for "rooming in" arrangements?
- What policies have been developed to provide for visitation by grandparents, siblings, and friends?
- Will patients experiencing stillborn births and/or the birth of a severely deformed or ill infant be assigned to the post-partum unit or to another area of the hospital?
- Will the unit be used for "clean" gynecology patients during periods of low census?

TYPES OF SPACE

The space to be allocated to the medical, surgical, pediatric, psychiatric, obstetrical, and newborn nursing units during the programming activity can be categorized into three major types:

- Primary activity space
- Support space
- Administrative space

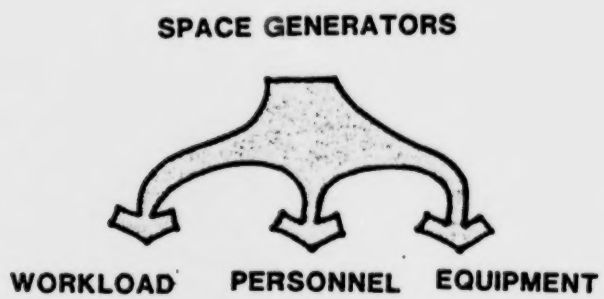
All spaces within a hospital fall into one of these categories and all categories usually appear in a given hospital. Some planners, however, also include categories for education and research space although these areas are generally included under administrative space.

Primary activity spaces are also referred to as procedure or technical spaces and describe rooms or areas where an actual service or procedure takes place, such as a patient room. These spaces generally occur in inpatient nursing or diagnostic and treatment services, and their numbers and sizes are commonly determined by measuring and projecting workloads for the particular service or department.

Once the primary activity spaces for a particular service or department are identified, the appropriate support and administrative spaces can be determined. Support space includes rooms or areas such as a clean supply room or an equipment storage room. The numbers and sizes of these spaces are generally determined from the required primary activity spaces (patient rooms). Administrative spaces are generally determined from the number and categories of personnel assigned to the department. Examples of administrative spaces would be a head nurse's office or a staff lounge.

SPACE GENERATORS

Space programming can be accomplished at various levels of detail and accuracy depending on the amount of available or requested data at particular stages during the facility planning process. The prime space generators for the medical, surgical, pediatric, psychiatric, obstetrical, and newborn nursing units are shown below:



These elements are extensively interrelated and care must be exercised to avoid taking any one item out of its proper context. Furthermore, overlying the total programming function are qualitative considerations which require the participation of informed planners to properly complete the space program. A discussion of these primary space generators will follow.

WORKLOAD

Since the patient's bed is the focal point of the provision of nursing services, patient beds are the key to the planning of inpatient nursing units. The following questions are of major importance:

- How many beds?
- What kind?
- How will they be used and how much?
- How will they be arranged?

Planning nursing units appears to be a very simple task because the average area per bed is similar in most hospitals and the sizes and configuration of the nursing units are generally not an issue until the design phase. However, many issues surround the question of the number of beds, making the planning activity much more complex than it initially appears. The number of beds planned for a given hospital will depend on such factors as the total need for beds within the hospital's service area, the number of physicians on the staff, the number of beds that will be provided by other hospitals, the number and sizes of those hospitals, and the expected occupancy rates.

Determination of bed need is a complex matter. This report will only touch on some of the issues that must be examined and methodologies that can be applied to determine the appropriate number and mix of inpatient beds. The planner should be forewarned that a great deal of thought, analysis, and political ingenuity will be needed.

Factors that Affect Bed Need

In order to determine how many beds a hospital should provide, one must carefully examine not only the internal operations and characteristics of the particular institution under study, but also evaluate and attempt to quantify outside forces. Those outside forces include the type and character of other hospitals in the service area, the characteristics of the population residing in the service area, and the present and developing technology which may impact the way health care is to be delivered.

Internal factors that must be analyzed include the following:

- What type of institution is under study? General acute care providing adult and pediatric medical and surgical services? Obstetrical services? Psychiatric services? Rehabilitative services?
- Will all existing services continue to be provided?
- What has the history of utilization been? Are patient days and/or admissions increasing? Decreasing? Stable?
- Does any particular service show an unusual trend?
- What specialties are represented on the medical staff? Primarily family practitioners? Cardiologists? Orthopedists? Gerontologists?
- Who are the principal admitters? Generalists? Specialists?
- What are their ages, where do they practice, where do their patients come from? Are they going to retire soon?
- What new services are being proposed? What is the expected utilization of new services?
- What is the desirable occupancy level of beds in each service?

Issues concerning internal factors should be more easily identified, quantified, and resolved than external implications because the information needed should be available from within the institution. However, data and information on external factors must be derived from a number of sources. These sources include local, provincial, and federal planning agencies and other health care providers in the area, demographers, etc. Some of the external factors that must be examined include the following:

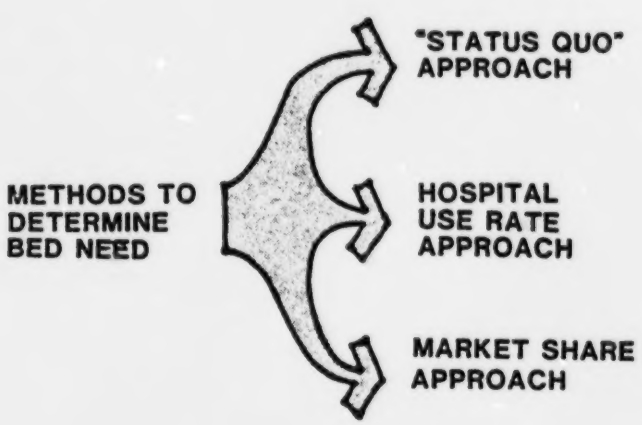
- Is there a higher than average percentage of elderly in the service area? (Persons over 65 are admitted to the hospital more frequently and tend to stay longer than younger cohorts.)
- Is the population getting older?
- Is the population center in one community or more than one? Is it rural? (City dwellers tend to utilize hospital services more readily than rural dwellers.)
- Is there a higher than average percentage of non-white population? (Certain diseases are more prevalent in non-whites.)
- What is the income level of area residents?

- Will there be a change in eligibility requirements in the future?
- What are the leading causes of morbidity and mortality in the area? Has the rate of death and disease changed over the last five years?
- What efforts are needed to reduce morbidity and mortality?
- Will programs be implemented to reduce utilization of inpatient services in the future?
- What has been the historic utilization of other area hospitals?
- Are other area hospitals implementing new programs that will affect the hospital's utilization?
- Will new industry bring more residents to the area?
- Are any industries discontinuing operations? Will people be moving out of the area?
- Are there geographic barriers that limit access to the hospital? Now? Future?

Some of the above factors may be more relevant to a particular situation than others, but all should be addressed during the hospital's planning process and determination of bed need.

Methods to Determine Bed Need

Determination of how many inpatient beds any particular hospital will need in future years is far from an exact science. The risks involved can be minimized through careful planning and establishing goals and priorities upon which future actions are predicated and which are measurable and achievable.



Status quo approach. The simplest approach to determining bed need is to look at historic utilization and determine the appropriate number of beds to satisfy historic and current demand. This approach is applicable in areas where there is a stable population and for an institution which seeks the "status quo."

One approach to determine bed need to satisfy the status quo is to establish what the historic average daily census has been, and set a desirable occupancy level (i.e., one which provides an efficient utilization of beds and staffing). Table 1 below provides an example of this approach.

TABLE 1

DESIRABLE OCCUPANCY APPROACH

	ADULT MEDICAL/ SURGICAL	PEDIATRIC MEDICAL/ SURGICAL	OBSTETRICS	PSYCHIATRY
Current Year ADC*	256	18	21	30
Last Year ADC	270	19	24	27
Year Before ADC	245	18	23	26
Three-year average ADC	257	18	23	28
Desirable Occupancy	90%	70%	70%	85%
Bed Need**	286	26	33	33

TOTAL BED NEED = 378

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*ADC = average daily census (total patient days by service - 365 = ADC).

**Bed need calculation: three-year average ADC ÷ $\frac{\text{desirable occupancy}}{100}$.

Another approach to the status quo is application of the Poisson distribution formula. The Poisson formula basically allows determination of bed need according to the desired level of assurance of the availability of a bed. Under this approach, one has to establish the desired level of assurance of bed availability (e.g., 90% of the time a bed should be available or 95% or 99%). One then uses the Z value from a table of normal values which represents the desired confidence level. The basic formula to use for the Poisson approach is as follows:

$$\text{Bed Need} = \text{ADC} + Z\sqrt{\text{ADC}}$$

Using the data or three-year average ADC from Table 1 and assuming an adult medical/surgical bed should be available 90% of the time, a pediatric medical/surgical bed 99% of the time, an obstetrical bed 99% of the time, and a psychiatric bed 95% of the time, the following bed need is calculated.

TABLE 2

POISSON DISTRIBUTION APPROACH

Adult Medical/Surgical Bed Need at 90% Confidence	=	$257 + 1.282\sqrt{257}$	= 278
Pediatric Medical/Surgical Bed Need at 99% Confidence	=	$18 + 2.330\sqrt{18}$	= 28
Obstetrical Bed Need at 99% Confidence	=	$23 + 2.330\sqrt{23}$	= 34
Psychiatric Bed Need at 95% Confidence	=	$28 + 1.645\sqrt{28}$	= 37
TOTAL BED NEED			377

The obvious shortcoming of the status quo approach is that it does not look at what is occurring outside the hospital in the external environment.

Hospital use rate approach. The hospital use rate approach uses patient origin data and population data to determine the rate of usage of the hospital by service area residents. Knowing the rate of use for the current year, one can project use in future years by multiplying the existing use rate times the future population. Application of the formula is shown in the example on the following page.

EXAMPLE

FORMULA:

$$\frac{\text{Medical/Surgical Discharges}}{\text{Current Service Area Population}} = \text{Adult Medical/Surgical Use Rate Per Person}$$

$$\text{Adult Medical/Surgical Use Rate} \times \text{Future Population} = \text{Future Discharges}$$

$$\text{Future Discharges} \times \text{Average Length of Stay} = \text{Future Patient Days}$$

$$\frac{\text{Future Patient Days}}{365} = \text{Future Average Daily Census (ADC)}$$

$$\text{ADC} \div \frac{\text{Desired Occupancy}}{100} = \text{Bed Need}$$

DATA:

- Adult Medical/Surgical Discharges = 3,240
- Current Population = 90,000
- Current Population Over 15 = 67,500
- Future Population = 100,000
- Future Population Over 15 = 75,000
- Average Length of Stay = 10 days
- Desired Occupancy = 90%

APPLICATION:

$$\frac{3{,}240}{67{,}500} = \text{Adult Medical/Surgical Use Rate of 0.048 Discharges Per Person}$$

$0.048 \times 75{,}000 = 3{,}600$ Future Adult Medical/Surgical Discharges

$3{,}600 \times 10 = 36{,}000$ Future Patient Days

$$\frac{36{,}000}{365} = 98.6 \text{ Future Average Daily Census}$$

$$98.6 \div \frac{90\%}{100} = 110 \text{ Adult Medical/Surgical Beds Needed}$$

This method has significant application to situations where a hospital serves patients from diverse communities, each having different rates of use of the hospital and different rates of population growth.

One can also carry the hospital use rate to various levels of detail. Rather than looking at the overall rate of use for adult medical/surgical care (as in the example), one can examine use rates by type of service (i.e., cardiology, orthopedics), by type of diagnosis, and/or by more definitive age group (e.g., 15 to 44 years, 65 to 74 years).

The use rates thus determined can and should be adjusted based on the hospital's plans for program and service expansion or contraction. For instance, if a hospital plans on discontinuing a service, the use rates would have to be reduced when projecting utilization in future years. Likewise, if a new service were being added, one would increase the utilization rates. The level of increase or decrease will depend on the programs and services to be offered and should be carefully described in the hospital's long-range planning document.

Market share approach. The market share approach goes a step beyond the hospital use rate approach, but is based on the same concept.

In the market share approach, the overall use rates for a region or geographic area are determined and compared to the hospital use rate to determine what share of the market the hospital is satisfying. For example, if the overall adult medical/surgical discharge rate per person in an area was 0.175 and the rate for the hospital was 0.048 adult medical/surgical discharges per person, then the hospital had 27.4% of the total market [(0.048 - 0.175) x 100 = 27.4%].

Knowledge of what share of the market a hospital has versus other area hospitals is most beneficial in setting program and service goals and objectives. This information, supplemented with information such as health status, trends in population growth, characteristics of the population, and physician location, presents a comprehensive data base for planning hospital services.

To present an example of the market share approach to determine bed need, assume as above that the hospital has 27% of the adult medical/surgical market and that the neighboring hospital with similar utilization also has 27% of the market, but the remaining 46% of the market is leaving the area to receive care. One may wish to establish a goal to provide at least 50% of the needed care at the hospital under study. An example of this approach to determine adult medical/surgical bed need is presented on the following page.

EXAMPLE

FORMULA:

$$\frac{\text{Current Hospital Use Rate}}{\text{Current Regional Use Rate}} = \text{Current Percent of Market}$$

Target % of Market x Regional Use Rate = Target Use Rate

Target Use Rate x Future Population = Future Discharges

Future Discharges x Average Length of Stay = Future Patient Days

$$\frac{\text{Future Patient Days}}{365} = \text{Future Average Daily Census (ADC)}$$

$$\text{ADC} \div \frac{\text{Desired Occupancy}}{100} = \text{Bed Need}$$

DATA:

- Current Hospital Use Rate = 0.048
- Current Regional Use Rate = 0.175
- Target = 50% of Market
- Future Population = 75,000
- Average Length of Stay = 10 days
- Desired Occupancy = 90%

APPLICATION:

$\frac{0.048}{0.175}$ = 27% of market

50% x 0.175 = 0.0875 Target Use Rate

0.0875 x 75,000 = 6,563 Future Adult Medical/Surgical Discharges

6,563 x 10 = 65,630 Future Patient Days

$\frac{65,630}{365}$ = 180 Future Average Daily Census

$180 \div \frac{90\%}{100} = 200$ Adult Medical/Surgical Beds Needed

The market share approach is of particular value when new services are being added, services are being discontinued, other hospitals have announced plans to expand or reduce services that will affect the utilization of the hospital under study, when new physicians are being added, and to evaluate unmet needs.

It should be noted that it is often difficult to determine or obtain reliable regional use rates. In the absence of reliable regional data, the planner may rely on use rate statistics published in the Hospital Morbidity report from Statistics Canada. This report presents an exhaustive summary of use rates by diagnosis, by age group, and by province.

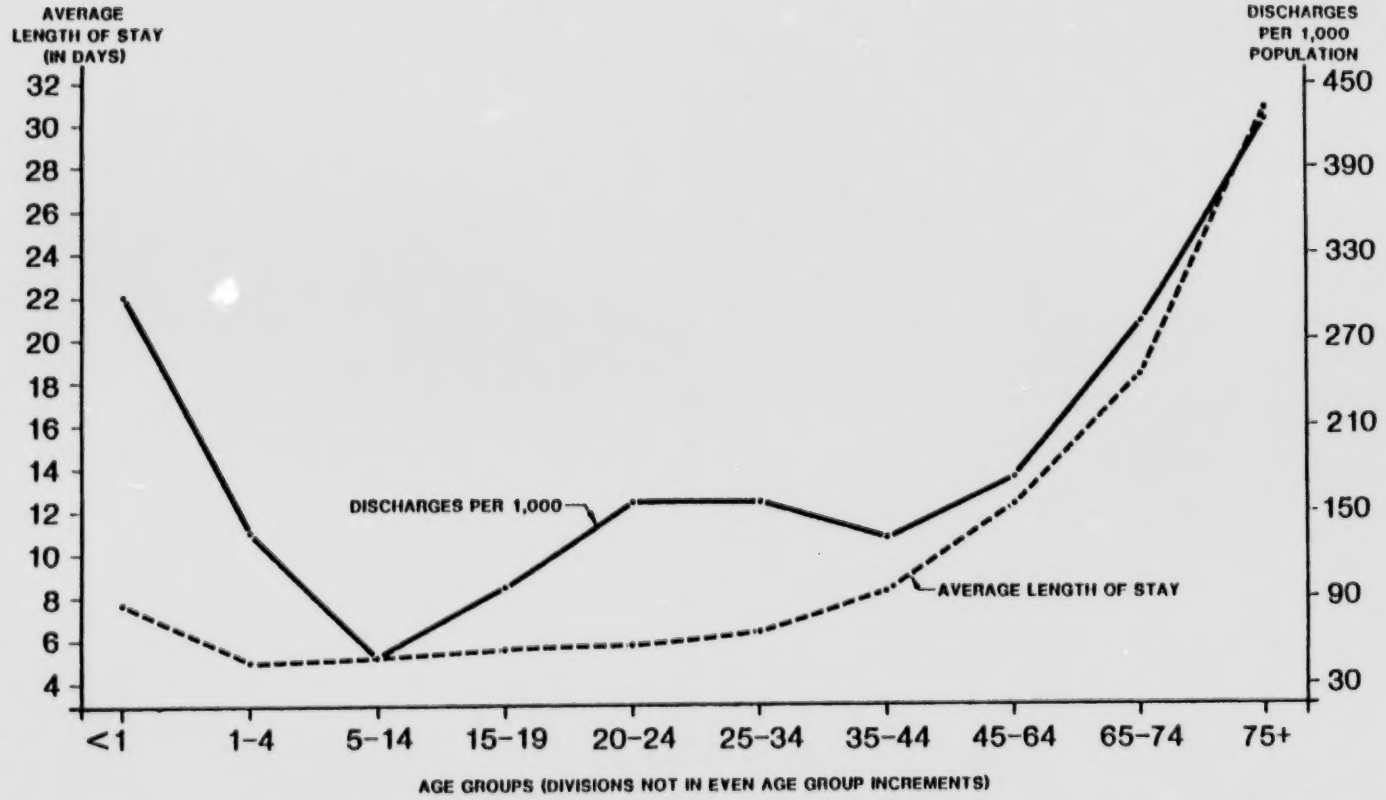
Effect of the Agedness of Population on Bed Need

The average resident of North America is getting older. This phenomenon is due to a number of factors: the birth rate is declining, yielding fewer younger residents; health status is improving due to elimination of many communicable diseases; and preventive and better health care is allowing persons to live to an older age.

However, there remains a striking differential in the rate of use of health care services by persons of various age categories. As can be demonstrated in Figure 2 on the following page, the very young (under age 1) and the elderly (over age 65) are admitted to the hospital more frequently than persons in the middle years. The very young are admitted more frequently for respiratory problems and disorders of the digestive system, while older residents succumb to the maladies associated with the aging process. As can also be demonstrated by the average length of stay, the young rebound from their illnesses more readily than do the elderly.

FIGURE 2

UTILIZATION OF ACUTE CARE SERVICES
BY AGE GROUP



Source: Hospital Morbidity (1977), Statistics Canada, November, 1980.

A statistical presentation of the discharge (per 1,000 population), lengths of stay, and days of care per 1,000 population by age group and major service is presented in Table 3 below. Persons over the age of 65 use about 15 times more hospital days of care than persons under 14 years and nearly 4 times that used by persons between the age of 45 and 64. Persons in the age group between 15 and 44 years of age have the lowest frequency of admissions to hospitals for medical and surgical problems. However, this age group represents the childbearing period which also explains the elevation of discharges per 1,000, demonstrated in Figure 2, for age groups 20 to 34.

TABLE 3

CANADIAN USE RATES BY AGE GROUP BY SERVICE

(PER 1,000 POPULATION)

AGE GROUP	MEDICAL/ SURGICAL	OBSTETRICS	PSYCHIATRY	OVERALL
0-14 Years				
Discharges per 1,000	98.3	0.2	0.7	99.2
ALOS*	5.5	4.1	20.3	5.6
Days of care per 1,000	537.0	0.7	14.6	552.3
15-44 Years				
Discharges per 1,000	87.9	45.5	7.2	140.6
ALOS	6.8	5.1	14.7	8.9
Days of care per 1 000	597.1	229.8	106.4	933.3
45-64 Years				
Discharges per 1,000	164.3	0.2	10.3	174.8
ALOS	12.0	6.1	17.6	12.3
Days of care per 1,000	1,966.4	0.9	181.6	2 148.9
Over 65 Years				
Discharges per 1,000	329.6	0	9.0	338.6
ALOS	23.9	0	41.9	24.4
Days of care per 1,000	7,870.3	0	375.4	8 245.7
All Ages				
Discharges per 1 000	126.6	21.5	6.4	154.5
ALOS	11.8	5.1	19.2	11.2
Days of care per 1,000	1,492.1	108.5	121.9	1 722.5

*ALOS = average length of stay.

Source: Hospital Morbidity (1977), Statistics Canada, November, 1980.

To demonstrate the effects of agedness on bed need, three communities of equal population size (i.e., 100,000), but with different age mixes were studied. The percent distribution of population in each age group for each community is presented in Table 4 below.

TABLE 4

AGE DISTRIBUTION OF COMMUNITY

(IN PERCENTS)

	COMMUNITY A	COMMUNITY B	COMMUNITY C
0-14 Years	28.9	24.0	22.5
15-44 Years	44.5	45.8	43.6
45-64 Years	19.3	19.4	19.0
Over 65 Years	7.3	10.8	14.9

Community A has the highest percentage of young residents, with 28.9% under age 15 and only 7.3% over the age of 65. Community B was more representative of the average community with 24% under 15 and 10.8% over the age of 65. Community C on the other hand, had the highest percentage of elderly (i.e., 14.9% over 65) and lowest percentage of young people (22.5% under 15).

Assuming the use rates by age group by service were valid for each community, the number of beds required to satisfy the needs of the residents of each community were determined and are presented below in Table 5.

TABLE 5

BED REQUIREMENTS FOR RESPECTIVE COMMUNITY

	COMMUNITY A		COMMUNITY B		COMMUNITY C	
	NO.	%	NO.	%	NO.	%
Adult Medical/Surgical	371	72.9%	458	77.6%	550	80.8%
Pediatric Medical/Surgical	61	12.0%	50	8.5%	47	6.9%
Obstetric	40	7.8%	41	6.9%	39	5.7%
Psychiatry	37	7.3%	41	6.9%	45	6.6%
TOTAL	509	100.0%	590	100.0%	681	100.0%

This presents an obvious and dramatic impact on bed need due to the age distribution of a population. Community A, the youngest community, can support 509 beds, or 5.09 beds per 1,000 population. Community C, on the other hand, should provide 681 beds for area residents or 6.8 beds per 1,000.

The question that arises is: as the population grows older, will more beds have to be added to the system? Or will alternative delivery means have to be developed? Or will the fact that the older person in 10 to 15 years will be a healthier person reduce the need for acute inpatient beds?

It can be seen from the discussion on the previous pages that the determination of the correct number of inpatient beds which should be provided by a given hospital is not only the key space generator in determining nursing unit space requirements but is also one of the key (if not the key) elements in institutional functional and space programming. The workload indicators expressed as average daily census, overall occupancy rates, average length of stay, and total patient days are prime factors in predicting the workload of all other hospital inpatient programs and services.

PERSONNEL

It is difficult to generalize about nursing personnel, given the variety of patient care needs and problems on the various types of nursing units: medical, surgical, pediatric, psychiatric, obstetrical, and newborn. However, the trend toward shorter hospitalization and increased acuity suggests the need for higher educational and preparation levels in the personnel who staff these units. Even the obstetric and newborn nursing areas, which are health rather than illness oriented, require a professional staff able to assess, plan, and meet the learning needs of families.

The direct impact of personnel upon space primarily comes from the need to provide adequate office space for the medical, managerial, and supervisory personnel (i.e., those whose spaces are categorized as "administrative"). The number of personnel in each of these positions will vary from hospital to hospital depending upon the medical and educational programs in effect and the department organization structure. Programming the administrative spaces involves counting up spaces such as offices, lockers, and conference areas which are needed and documenting the corresponding unit sizes of each. It is important to note that policy decisions made by the hospital administrative staff also have a major impact on the amount and size of departmental administrative spaces which are assigned.

An indirect impact of nursing personnel upon space comes from the nurse staffing methodology on a given unit. The most common of these methodologies are described on the following page. These methodologies may either dictate or may be dictated by space and design considerations. However, the planned nursing unit configuration should not build in future obsolescence. The design should provide adequate support space for efficient use of nursing personnel for direct and indirect patient care regardless of the method of organization.

Of course, the type of patients and their problems also has implications for the nursing care modality chosen for a given unit. For example, medical/surgical units with long-term patients would probably benefit the most from the one-to-one contact in primary nursing, while obstetrical units, with their associated shorter hospitalization, would probably benefit as well from team or modular nursing.

Patient acuity also affects the staffing requirements of a unit, as well as support space requirements (e.g., clean supply rooms and equipment storage areas). Patient classification systems such as those discussed in Appendix A are commonly utilized to determine staffing requirements.

NURSE STAFFING METHODOLOGIES

FUNCTIONAL NURSING	A system of patient care based upon the division of labor according to tasks and routines; selected functions are assigned to all personnel with no one person being responsible for each patient's direct nursing care.
TEAM NURSING	A system of patient care in which a Registered Nurse serves as team leader for a group of personnel who work together to provide care to assigned patients; the care of the patient is seen as a group task requiring the bestindividual and combined efforts of team members.
PRIMARY NURSING	A system of patient care in which one professional nurse assumes full (24-hour-a-day) accountability for a small caseload of patients from their admission to discharge; the focus is on a one-to-one relationship between the nurse and the patient and his/her family, with the care of the patient delegated to a secondary nurse on other shifts.
MODULAR NURSING	A system of patient care that is a combination of primary nursing and team nursing; a nursing unit is divided into modules (or bed groupings) and a professional nurse with responsibility for implementing the nursing process and coordinating other nursing personnel is assigned to the same patients every day.

Related also to staffing requirements is the concept of productivity. The guidelines for personnel productivity represent a range of levels that have been achieved in a cross-section of hospitals, based upon acceptable levels of quality. Two key points are that productivity (and quality) can be measured and that many hospitals have been able to achieve productivity levels near or even below the low end of the guideline range without sacrificing quality.

With these points in mind, the programmers should check the productivity levels actually being achieved in the existing unit. If the unit performs at or below the low end of the guideline range, then the lower end of the range should be used to estimate the number of staff required. It is merely common, responsible, managerial sense that a well-managed unit should be expected to maintain superior, but reasonable, productivity in a new or expanded facility. Building programs should not result in productivity penalties through a relaxation of historically effective management. Alternatively, if the unit performs at reasonably low levels of productivity, the programmers must be careful to avoid building causes of substandard performance into a new facility.

Programmers can check existing productivity levels by dividing the annual number of worked nursing hours by the total patient days experienced by the unit, resulting in total hours per patient day (HPPD). Specific situations in any given hospital may cause actual productivity levels to vary. For example, a hospital with a higher number of specialty intensive care beds will likely require a higher ratio of registered nurses because of the patient acuity level.

EQUIPMENT

Equipment needs on inpatient nursing units are usually concentrated in the patient room. Space for specialized equipment (e.g., traction equipment) may be required depending on the type of patients concentrated on a given unit (e.g., orthopedic patients). However, large equipment should be stored centrally rather than on individual nursing units.

Each individual patient room, whether a single patient room or a multiple bed room, should have an adjoining toilet with at least a handwashing lavatory and a water closet. Other mechanical services to be included in each room are oxygen and vacuum outlets and a nurse call system located above the head of the bed. Storage space, including a place to hang clothes, is usually built in. An often neglected but important consideration in planning the patient room is a shelf or wide window sill to hold personal items such as flowers and pictures. All too often the only space available for these personal items is the bedstand and overbed table, rendering this equipment less available for patient care activities. Room furnishings should include bed, bedside stand, overbed table and one or two chairs. However, the actual equipment items to be placed in each patient room will vary depending on the types of patients the unit serves.

APPROACH

Planning inpatient nursing units is a systematic process as illustrated in Figure 3 on the following page. Once the total inpatient bed need and the number of beds by specialty has been determined as an outcome of the institution's long-range plan, the next most important determination is the method of delivery of care and the actual sizes of the various nursing units and their configuration.

It is at this point that the functional and space programming activity can begin. The determination of the method of delivery of care and nurse staffing methodology on any given unit should reflect the purpose and philosophy of both the hospital and the inpatient nursing unit.

Since philosophy is a statement of beliefs which directs individuals toward the achievement of their purpose, the philosophy of the nursing department, as well as the unit's philosophy, will also have implications for space planning activities. An example of this would be an obstetric unit which adheres to a philosophy of family-centered maternity care. Such a philosophy would suggest a design which fosters easy access of parents to their infants. Thus one might expect a design that favors a number of smaller nurseries or "rooming in" units rather than several larger central nurseries. The ultimate pupose of the nursing department is the delivery of cost-effective, quality nursing care to patients, even though specific nursing units within the hospital may have different philosophies. However, at the same time, care should be taken not to build in future obsolescence. Nursing units should be planned with enough flexibility to accommodate changes in the method of delivery of care and patient mix.

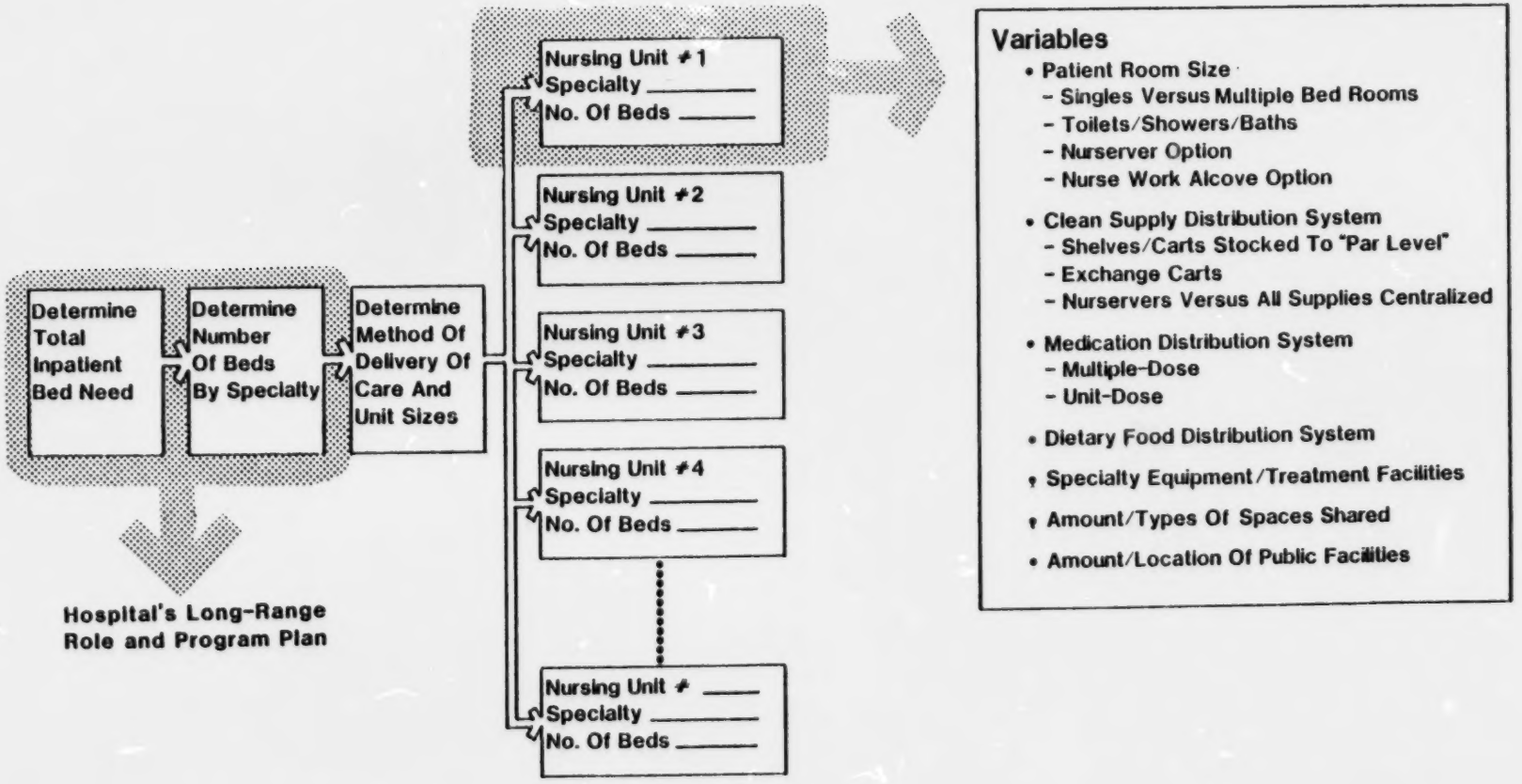
NURSING UNIT SIZE

The decision of which method of delivery of care to be employed on a particular nursing unit is closely interrelated with the nursing unit size and configuration. Considerable debate has taken place in the last decade among hospital planners, architects, and administrators as to the ideal nursing unit size. Although it is often stated that it is impossible to give high quality patient care in units larger than 30 to 40 beds, the two forces behind the trend in larger nursing units are:

- Rising hospital costs (both operational and capital investment).
- Serious shortage of professional personnel, especially nurses.

FIGURE 3

NURSING UNIT PLANNING PROCESS



Advocates of smaller nursing units (less than 30 beds) believe that a head nurse cannot staff or give quality care to more than 30 people. These smaller nursing units generally allow for the distance between the nursing station and the farthest bed to be no more than 24.4 to 27.4 meters (80 to 90 feet) which is considered a maximum distance for adequate supervision. There are also planners who believe a 20-to 25-bed nursing unit with single rooms provides the optimum of quality, personalized care than would occur on a larger unit.

Those who advocate larger nursing units (50 to 60 or more beds) argue that the economy of construction, fewer nursing stations and support facilities, and the economy of operation with fewer head nurses make larger, multi-purpose units the most cost-effective. Many of these proponents believe a skillful head nurse can run a larger unit successfully and economically.

The larger nursing division makes team nursing possible and permits changing the size of the teams according to the shift and patient requirements. As an example, the 60-bed nursing unit can be divided into four teams during the day shift, three teams on the evening shift, and two or even one team during the midnight shift. Part-time nurses have the security of working with a team which includes well-trained, full-time professionals familiar with the patients on the unit.

Advocates of medium-size nursing units (40 to 48 beds) provide arguments similar to all of those previously mentioned and believe that units of this size result in both the economies of size and the "personal touch." The ease of staffing, flexibility, and economical use of personnel are often associated with these units. These smaller 30- to 40-bed units can be further subdivided into smaller modules containing 12 to 14 beds. Often there is a central nursing station or communication center around which the smaller units or modules are organized. Each of the modules might also have smaller nursing stations which are centrally located in the module. A design such as this facilitates nursing care by the team, primary nursing, or modular nursing methodologies. These three methodologies are all felt to significantly decrease the fragmentation and depersonalization associated with the functional method of delivering care.

It should be noted that the term "nursing unit" can be used in two ways, both as a definition of the number of beds a single nurse or team of nurses can manage and observe (8 to 14 beds), and as the number of beds which can be supervised by one head nurse. What may be a large nursing unit in total beds need not be a large one in the organization of nursing staff. A large nursing unit of 60 beds is too large for one nurse to monitor, but there may be more than one nurse. Such a unit, however, may be economical in terms of space because the required support spaces (e.g., clean supply/soiled holding rooms, clerical space, etc.) may not be much greater than a unit half the size. Other factors which affect the decision as to what size nursing units should be planned for a given hospital include:

- Provincial regulation.
- Types of patients and the level of care and surveillance they require.
- Organization of nursing staff and hospital administration.
- Organization of clinical departments and attending physicians.
- Layout of the unit and its affect on the distances to be travelled by staff.
- Relationship to other nursing units and the configuration of nursing units by floor level and building.
- Type of accommodation (e.g., single rooms increase walking distances and reduce the desirable number of beds).

Regardless of the sizes and configuration of the nursing units, nurses should not have to walk more than 30.5 meters (100 feet) from the nursing station to the farthest patient's bedside and preferably this distance should be no greater than 24.4 meters (80 feet).

TYPE OF ACCOMMODATIONS

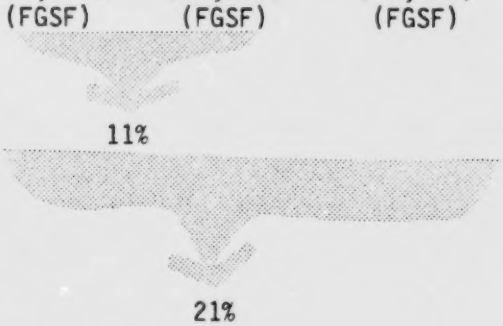
After the sizes, staffing methodology, and configuration of the nursing units have been determined, the activity of programming space for the various nursing units becomes a simple task. Although there are many options at this stage in terms of the design features of the patient room and the various material distribution systems, most of these variables do not have a significant affect on the total gross square meters (feet) to be allocated to a particular nursing unit. The decision as to the type of accommodations to be provided on a given nursing unit, however, does have a significant impact on space requirements.

For example, a typical 80-bed floor comprised of two 40-bed nursing units would require 7% more floor gross square meters (feet) of space for a 50/50 mix of single patient rooms and double patient rooms than if all double rooms were planned, and 21% more space if all private rooms are programmed. Although it is desirable to provide at least 20% of the room accommodations in private rooms, the difference between providing all double rooms versus providing all single rooms results in 560 FGSM (6,000 FGSF). At current construction costs (1981), this would result in an additional $600,000; when factors for escalation and financing are applied, the result would be over $1 000,000.

EXAMPLE

NURSING FLOOR (80 BEDS)

ALL DOUBLE BEDS	50/50* SINGLES AND DOUBLES	ALL SINGLE ROOMS
2,600 FGSM	2,880 FGSM	3,160 FGSM
(28,000) (FGSF)	(31,000) (FGSF)	(34,000) (FGSF)



*Assumes 40 single and 20 double bed rooms.

In the United States and Canada, the trend in hospitals has been to provide increasingly greater proportions of single patient rooms and to eliminate multiple-bed rooms, or wards, almost entirely. Operational advantages are obtained from a large proportion of single bed or private patient rooms since they allow for a more flexible mix of patients, resulting in an increased occupancy rate for the hospital as a whole. Private rooms give the patients and their visitors a maximum of privacy and eliminate the potential problem of disturbances from a roommate.

Generally speaking, single bed units have higher construction costs than multiple bed units, as shown previously, but permit higher occupancy levels. Double bed units, on the other hand, cost less initially to construct but are associated with a lower occupancy rate. Studies suggest that single bed units are associated with a higher quality of patient care but require a slightly higher staffing ratio than double bed units, which are associated with more patient transfers and a slightly lower staffing ratio.

Double rooms not only provide a more economical use of space but some patients do feel more comfortable with company. For patients who prefer company, the double room presents a solution. Two patients in a room develop a sense of intimacy which is different from the human presence without intimacy that is experienced by patients in multiple-bed rooms. The economic, educational, domestic status, and lifestyle characteristics of the service area population should be considered before the decision is arbitrarily made as to the proportion of single and double bed rooms to be programmed.

CENTRALIZED VERSUS DECENTRALIZED "NO-NURSING STATION" CONCEPT

Another programming option with space implications is the centralized nursing station versus the decentralized "no-nursing station" concept. The traditional nursing station serves as the hub of all activities on a given unit. Patients are admitted and discharged from the nursing station, all communications originate in or pass through the nursing station, physicians write orders and progress notes, nurses chart and, at times, prepare medications, professional staff confer about patient problems and progress, supplies are ordered, lab specimens are picked up, as well as a variety of other activities.

In contrast, in the decentralized nursing station design, these activities are divided into nursing or patient care activities and non-nursing or non-patient care activities. Those activities that relate directly to patient care are located in the patient rooms while those activities not directly related to patient care remain more centrally located. What was formally a nursing station becomes a communication center which has responsibility for all communications and traffic flow into and out of the unit. Patient requests are received in the center, screened, and directed to the appropriate nursing staff.

The major design approach in the decentralized nursing station concept has to do with the patient's immediate environment. The nursing unit is designed to make available to the nurse in the patient room all the supplies and medications needed to provide care for that patient. In addition, the patient's chart may be located in the patient's room to facilitate charting and other record keeping. A "nurserver" or pass--through supply cabinet in the patient room is used for the delivery and storage of clean supplies and medications. Soiled and used supplies are picked up from the "dirty" side of the nurserver. This organization enables the nursing staff to spend more time with patients providing direct patient care while the supply duties are assigned to a supply technician who is part of the hospital's materiel management team. Medication orders are picked up at the patient unit or sent to pharmacy via a pneumatic tube system located on the patient unit.

Proponents argue that this system provides more efficient use of nursing time and puts the nurse back at the patient's bedside. Studies also indicate that a nurse spends 15% less walking time using this system. However, some nurses using the system indicate that it

puts the nurse in the patient's room but not necessarily at the bedside. The disadvantages of the system are more subtle because they are primarily social. With no central point at which to find anyone, one tends to work alone, which affects nurse/nurse and nurse/physician interaction. Although the administrative control clerk can radiopage a nurse when a physician arrives on the unit, it is easy for nurses to avoid certain physicians and vice versa. The elimination of the central nursing station can contribute to a lack of interpersonal communication among the professional staff. Most problems with this system, however, are a result of a failure to include all the appropriate design features in the planning of the unit (e.g., communication system) to make the system work, as well as properly training the staff in the system's use.

OTHER VARIABLES

Other planning decisions regarding clean supply, medication, and food distribution systems have a significant impact on the operation of a given nursing station but a minimal impact on space allocations. For example, the type of dietary food preparation and distribution system (i.e., conventional, convenience, cook/chill, or cook freeze) would impact the type of carts to be purchased and the design features of the nourishment or clean supply room where the dietary cart may be positioned, but the actual space required for a dietary cart containing meal trays for a given number of patients varies insignificantly.

More significantly, the decision to utilize a central nursing station concept versus the decentralized concept, as previously discussed, directly relates to the centralization of clean supplies and medications versus positioning them at the point of use (patient room). Along with the design detail of a "nurserver" in the patient room, a work alcove for the nurse (e.g., charting surface) may also be programmed.

The private or semiprivate patient room with an adjoining toilet room with a handwashing lavatory and a water closet is becoming the standard in Canadian and American hospital construction, and the provision of private bathtubs or showers is also becoming more common. Often to reduce the cost, showers may be placed such that they can be shared by two adjoining private or semiprivate patient rooms (two to four beds). The provision of adjoining showers is particularly desirable for obstetrical patients where early ambulation is therapeutic.

Finally, specialty equipment requirements and treatment facilities will also vary from one unit to another, depending primarily on the type and acuity of patients on the unit (e.g., orthopedic or neurology patients). Other factors, such as the number of nursing units per floor level and their proximity to each other, determine which spaces can be shared (e.g., staff lounges, lockers). The location of public spaces affects the provision of visitor waiting areas and public toilet facilities on the particular nursing unit.

METHODOLOGY

Certain differences do exist between specialty nursing units, but with the exception of psychiatric nursing units and newborn nurseries, these predominantly involve non space related or minimal space related items, notably environmental considerations (e.g., lighting, temperature, acoustics), design features (e.g., carpeting, tile flooring, linoleum), specialty equipment, and staffing patterns. Several specialty equipment storage and treatment spaces are unique to some units, such as traction equipment storage on a unit where orthopedic patients are concentrated or an infant feeding room in the newborn nursery or post-partum nursing unit. However, the similarities between units make the space programming activity fairly simple.

Generally, psychiatric nursing units in community hospitals are limited to short-term admissions, although these admissions may be considered long-term relative to the treatment of other types of illnesses. Some psychiatric nursing units function almost entirely apart from other inpatient nursing units, except for providing consulting services when medical, surgical, obstetrical, or pediatric patients show evidence of psychic disturbance. Other psychiatric nursing units are more integrated and emphasize the physically based or chemical nature of mental illness and treatment. These differences in orientation may impact the design and location of facilities.

Although some design details may differ, patient rooms in psychiatric nursing units are generally the same size as any other patient room. Some planners feel that the typical hospital arrangement with central nursing stations is inappropriate for psychiatric patients and prefer to create a therapeutic "milieu" by grouping patient bedrooms around living/lounge spaces to encourage interaction and better duplicate a residential environment. Alternatively, the construction of very specialized facilities is expensive and limits the future flexibility of being able to convert the unit to a general inpatient nursing unit at some future time. Psychiatric nursing units do require a significant amount of space for activities such as individual and group psychiatric therapy, recreation and occupational/activity therapy, reading, and physical recreation. Therefore, disregarding major space consuming functions, such as gymnasiums and assembly halls, the support space allocated to a psychiatric nursing unit during the development of the space program is a significantly greater proportion of the space allocated to primary activity rooms (patient rooms).

Newborn nurseries are also unique in terms of space programming because of the type of patients (infants) served. Generally, the number of bassinets to be provided relates directly to the number of obstetrical beds to be provided and the total annual deliveries. The proportion of high-risk infants to normal infants affects the type of bassinets to be provided. To some extent, pediatric nursing units are also unique because a certain number of bassinets are provided for infants beyond the postnatal period (28 days). These nursing units are generally designed and equipped similar to adult units to provide

a maximum of flexibility for future conversion or interchangeability. Viewing windows, however, are commonly placed in the wall between the patient room and the corridor to maximize nursing station to patient bedside surveillance.

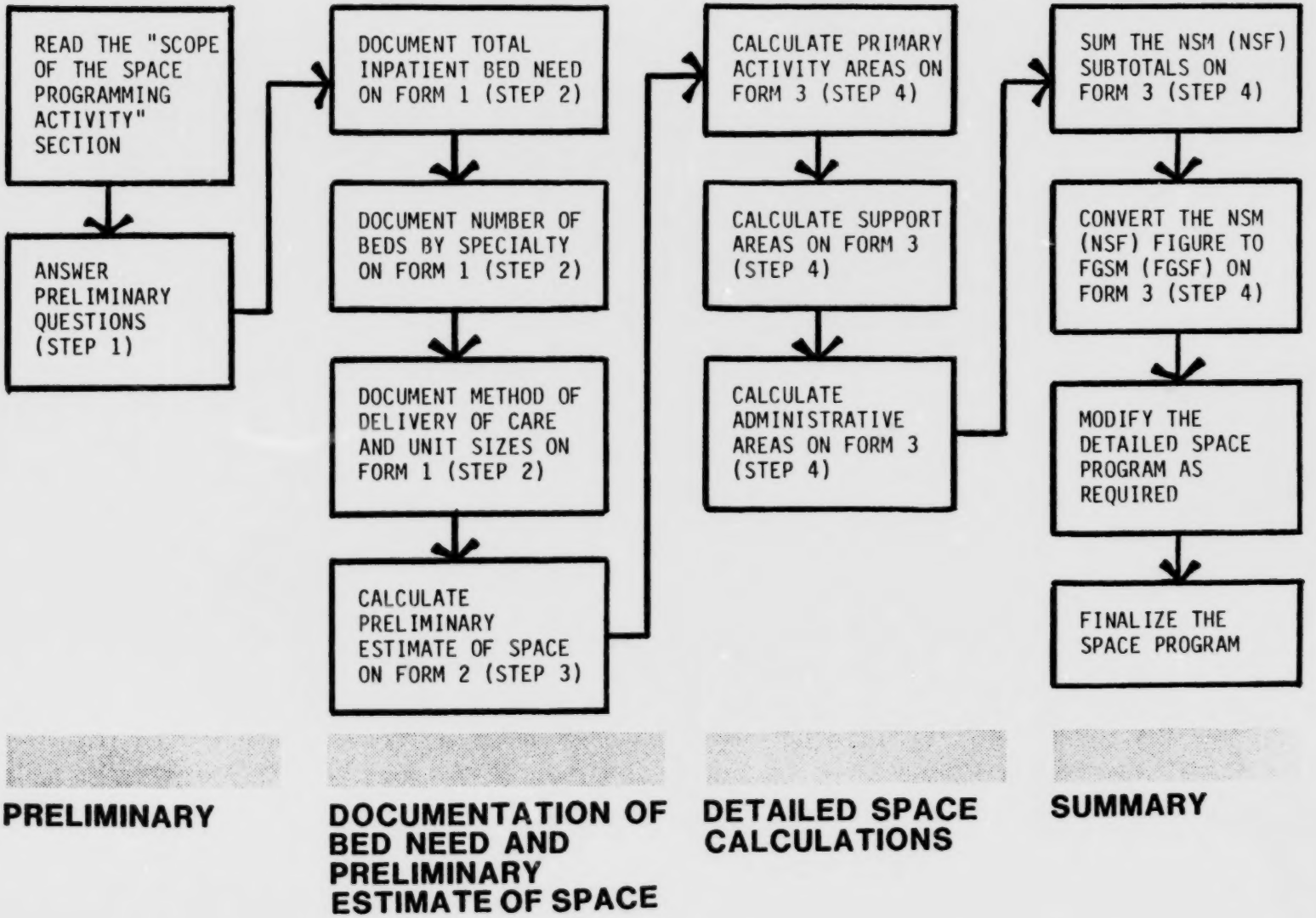
Although the programming of long-term care nursing units is not discussed in this manual, the space requirements both for self-care and chronic long-term care patients may be quite different. Self-care patients are those medical, surgical, or psychiatric patients who are physically self-sufficient but require diagnostic or convalescent care in home-type accommodations. Chronic long-term care patients are those who have poor rehabilitative potential, require substantial nursing support, and will probably be hospitalized for six months or more and whose activities will be confined primarily to their nursing units.

A single nursing station can accommodate a larger number of patient beds on a self-care nursing unit. Also, on both self-care and chronic long-term care units, additional space may be required for activity and continuous rehabilitation programs (mainly self-care patients), as well as patient dining space. The patient rooms may also be equipped differently and living areas provided to obtain a more home-like environment.

Figure 4 presents a flow chart of the space programming methodology. The process begins with the documentation of total bed need and beds by service, which is a direct outcome of the hospital's long-range role and program plan, and the documentation of the method of delivery of care and number of beds by nursing unit, which is a direct outcome of the functional program.

FIGURE 4

EVALUATION AND SPACE PROGRAMMING METHODOLOGY FLOW CHART


READ THE "SCOPE OF THE SPACE PROGRAMMING ACTIVITY" SECTION
ANSWER PRELIMINARY QUESTIONS (STEP 1)
DOCUMENT TOTAL INPATIENT BED NEED ON FORM 1 (STEP 2)
DOCUMENT NUMBER OF BEDS BY SPECIALTY ON FORM 1 (STEP 2)
DOCUMENT METHOD OF DELIVERY OF CARE AND UNIT SIZES ON FORM 1 (STEP 2)
CALCULATE PRELIMINARY ESTIMATE OF SPACE ON FORM 2 (STEP 3)
CALCULATE PRIMARY ACTIVITY AREAS ON FORM 3 (STEP 4)
CALCULATE SUPPORT AREAS ON FORM 3 (STEP 4)
CALCULATE ADMINISTRATIVE AREAS ON FORM 3 (STEP 4)
SUM THE NSM (NSF) SUBTOTALS ON FORM 3 (STEP 4)
CONVERT THE NSM (NSF) FIGURE TO FGSM (FGSF) ON FORM 3 (STEP 4)
MODIFY THE DETAILED SPACE PROGRAM AS REQUIRED
FINALIZE THE SPACE PROGRAM
PRELIMINARY
DOCUMENTATION OF BED NEED AND PRELIMINARY ESTIMATE OF SPACE
DETAILED SPACE CALCULATIONS
SUMMARY

methodology

METHODOLOGY

(Blank methodology forms are shown in Appendix C and a completed example of this methodology is presented in Appendix D.)

STEP 1-PRELIMINARY QUESTIONS

The answers to the following questions determine the space requirements for rooms or areas which are dictated primarily by operational concepts or institutional policy. If any of these questions have not been previously discussed and the decisions documented, then the functional program must be revised before beginning Step 2 of the methodology.

MEDICAL/SURGICAL NURSING UNITS

- What proportion of private and semiprivate patient rooms will be provided? How many isolation rooms will be provided for each nursing unit? Will patient toilet rooms be provided with showers? Will nurse work alcoves and nurservers be planned? (Form 3A, Line 1A)

- Will an exam/treatment room be programmed for each nursing unit or shared between several units? (Form 3A, Line 1B)

- Will a patient sitz bath be programmed? (Form 3A, Line 2J)

- Will a conventional nursing station be programmed or will the "no nursing station" concept be employed, necessitating a central administrative control center for each floor level and decentralized team conference centers? Will physician dictation booths be programmed? (Form 3A, Lines 3A through 3D)

- For whom will offices be provided? Will additional space for secretarial/clerical functions be programmed? (Form 3A, Lines 3E and 3F)

- Will staff facilities be provided on the nursing unit, shared with other nursing units, or centralized for all hospital employees? (Form 3A, Lines 3G through 3K)

- Will a staff conference room be programmed? Will this room be shared with other units? (Form 3A, Line 3L)

PEDIATRIC NURSING UNITS

- What proportion of private and semiprivate patient rooms will be provided? How many isolation rooms will be provided for each nursing unit? Will patient toilet rooms be provided with showers? Will nurse work alcoves and nurservers be planned? (Form 3B, Line 1A)
- Will an exam/treatment room be programmed for each nursing unit or shared between several units? (Form 3B, Line 1B)
- Will an admission/family room be programmed? (Form 3B, Line 2A)
- Will a classroom be provided for patients requiring tutoring? (Form 3B, Line 2J)
- Will a conventional nursing station be programmed or will the "no nursing station" concept be employed, necessitating a central administrative control center for each floor level and decentralized team conference centers? Will physician dictation booths be programmed? (Form 3B, Lines 3A through 3D)
- For whom will offices be provided? Will additional space for secretarial/clerical functions be programmed? (Form 3B, Lines 3E and 3F)
- Will staff facilities be provided on the nursing unit, shared with other nursing units, or centralized for all hospital employees? (Form 3B, Lines 3G through 3K)
- Will a staff conference room be programmed? Will this room be shared with other units? (Form 3B, Line 3L)

PSYCHIATRIC NURSING UNITS

- What proportion of private and semiprivate patient rooms will be provided? How many seclusion rooms will be provided for each nursing unit? Will patient toilet rooms be provided with showers? (Form 3C, Line 1A)
- Will an exam/treatment room be programmed for each nursing unit or shared between several units? (Form 3C, Line 1B)
- Will a patient dining area be programmed? (Form 3C, Line 2H)
- Will a laundry room be provided for patients who wish to do their own laundry? (Form 3C, Line 2I)
- Will group therapy rooms be utilized? How many? (Form 3C, Line 2K)

- Will interview/consultation rooms be programmed for individual therapy? (Form 3C, Line 2L)
- Will a television/music room be programmed? (Form 3C, Line 2M)
- Will physician dictation booths be programmed? (Form 3C, Line 3B)
- For whom will offices be provided? Will additional space for secretarial/clerical functions be programmed? (Form 3C, Lines 3C and 3D)
- Will staff facilities be provided on the nursing unit, shared with other nursing units, or centralized for all hospital employees? (Form 3C, Lines 3E through 3I)
- Will a staff conference room be programmed? Will this room be shared with other units? (Form 3C, Line 3L)

OBSTETRICAL NURSING UNITS

- What proportion of private and semiprivate patient rooms will be provided? How many isolation rooms will be provided for each nursing unit? Will patient toilet rooms be provided with showers? Will nurse work alcoves and nurservers be planned? (Form 3D, Line 1A)
- Will an exam/treatment room be programmed for each nursing unit or shared between several units? (Form 3D, Line 1B)
- Will an infant feeding room be required? (Form 3D, Line 2I)
- Will an education/family conference room be programmed? (Form 3D, Line 2J)
- Will a patient sitz bath be programmed? (Form 3D, Line 2L)
- Will a conventional nursing station be programmed or will the "no nursing station" concept be employed, necessitating a central administrative control center for each floor level and decentralized team conference centers? Will physician dictation booths be programmed? (Form 3D, Lines 3A through 3D)
- For whom will offices be provided? Will additional space for secretarial/clerical functions be programmed? (Form 3D, Lines 3E and 3F)

- Will staff facilities be provided on the nursing unit, shared with other nursing units, or centralized for all hospital employees? (Form 3D, Lines 3G through 3K)

- Will a staff conference room be programmed? Will this room be shared with other units? (Form 3D, Line 3L)

NEWBORN NURSERIES

- Will an entry alcove be provided for scrubbing and gowning prior to entering the nursery area? (Form 3E, Line 2A)

- Will a formula room be required? (Form 3E, Line 2E)

- Will an infant feeding room for post-partum patients be provided? (Form 3E, Line 2F)

- For whom will offices be provided? Will additional space for secretarial/clerical functions be programmed? (Form 3E, Lines 3A and 3B)

- Will staff facilities be provided on the nursing unit, shared with other nursing units, or centralized for all hospital employees? (Form 3E, Lines 3C through 3G)

- Will a staff conference room be programmed? Will this room be shared with other units? (Form 3E, Line 3H)

STEP 2-DOCUMENTATION OF BED NEED

Document the projected total medical/surgical, pediatric, psychiatric, and obstetrical beds and newborn nursery bassinets in the corresponding boxes on Form 1. As discussed previously, this data should be available in the hospital's long-range plan. The planning horizon year should also be documented on Form 1 as well as the approach(es) used to determine bed need.

If not documented in the long-range plan, the number of newborn nursery bassinets required should be determined from the following formula:

$$\frac{\text{Projected Annual Deliveries} \times \text{Average Length of Stay} \times \text{Desired Occupancy Rate}}{365} = \text{Number of Bassinets Required}$$

As a guideline, an occupancy level of 65% (0.65) should be used where there is a need for 25 or less bassinets and 70% (0.70) where the need is greater than 25.

In projecting the total annual deliveries, the following factors should be considered:

- Age groups of the population to be served.
- Social and ethnic considerations.
- Designated level of care to be provided by the labor and delivery suite.*
- Geographical size of the region served.
- Referrals from other areas.

Another "rule of thumb" that may be used for estimating the number of nursery bassinets is to provide the same number of bassinets as the average daily census of the post-partum nursing unit plus 10%.

After the beds by specialty and required bassinets are documented, a tabulation of the total beds by specialty by nursing unit should be made. The building (or wing) where the unit will be located, floor level, number of beds, and the method of delivery of care or unit organization (e.g., primary, team nursing) should be listed for each nursing unit. If the location and floor level is unknown pending design decisions, then leave these columns blank.

STEP 3-PRELIMINARY ESTIMATE OF SPACE

3.1 - PRELIMINARY CALCULATIONS

3.1.1 - From Form 1, Line 1, enter the total medical/surgical bed requirement on the designated lines on Form 2, Line 1.

3.1.2 - Place a checkmark in the box indicating the desired type of patient accommodations.

3.1.3 - Multiply the total projected beds by both of the figures corresponding to the line in which a box was checked to determine the preliminary space range in floor gross square meters (feet). Enter the preliminary space range in the designated boxes on Form 2, Line 1.

3.1.4 - Perform Steps 3.1.1 through 3.1.3 for each of the inpatient nursing specialties identified on Form 1.

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*"Labor and Delivery Suite (#5)," Evaluation and Space Programming Methodology Series, November, 1978.

3.1.5 - In calculating the preliminary space range for the newborn nurseries, simply enter the number of bassinets required on the designated lines on Form 2, Line 5 from Form 1, Line 5 and multiply by the figures indicated.

A minimum of 55.8 gross square meters (600 gross square feet) should be programmed, which accommodates up to four bassinets regardless of the number of bassinets required.

STEP 4-DETAILED SPACE CALCULATIONS

4.1 - PRIMARY ACTIVITY AREAS

4.1.1 - Calculate the primary activity space NSM (NSF) requirements as indicated on Forms 3A through 3D, item 1. A separate form is completed for each nursing unit to be programmed and each form is identified as to the nursing unit specialty. The following comments apply to specific rooms or areas:

- Patient Rooms. This methodology allows for private and semiprivate rooms only. If three or four-bed rooms are to be programmed, add an additional 7.4 (80) per bed to the space required for a semiprivate patient room. In multi-bed rooms, appropriate clearances should be provided at the foot of each bed for the passage of equipment and beds. Each patient should have access to a toilet room without entering a general corridor. It is assumed that each toilet room will include a lavatory and water closet, although a separate handwashing lavatory may also be provided in the patient room. A closet or locker, suitable for hanging full-length garments and storing personal items, should also be provided for each patient.

  Isolation rooms should be provided for patients requiring isolation because of infection. Approximately one isolation room should be provided for every thirty beds. These rooms should be planned similarly to a private patient room except that an entrance corridor or vestibule shoulde be provided (e.g., closed anteroom or passageway open to the room) which contains a handwashing lavatory, storage space for clean and soiled materials, and gowning facilities.

  In psychiatric nursing units, a seclusion room should be provided for patients requiring security and protection either from himself/herself or others. The room should be a private room which

provides direct supervision of the patient by the nursing staff, and is designed to minimize the patients hiding, escape, or injury. Access to the toilet room should be controlled and may occur through a secured anteroom.

- Exam/Treatment Room. This room can be omitted if all patients are accommodated in single-bed rooms. The room should contain a handwashing lavatory or sink, storage facilities, and a writing surface.

4.1.2 - Calculate the primary activity space NSM (NSF) requirements for newborn nurseries as indicated on Form 3E, item 1. The following comments apply to specific rooms or areas:

- Newborn Nurseries. Each normal newborn nursery should be provided with approximately one handwashing lavatory per 8 infant bassinets and a maximum of 16 bassinets should be provided in a single nursery. The total number of bassinets can be reduced if a "rooming-in" program is planned.

- Special Care Nursery. A special care nursery should be provided in hospitals with 25 or more post-partum beds. This area provides continuing care for infants requiring close observation (e.g., low birth weight).

- Exam/Treatment Area. This space should contain a work counter, storage facilities, and a handwashing lavatory and may be contiguous with the nursery areas or combined with the clean workroom.

4.2 - SUPPORT AREAS

4.2.1 - Calculate the support space NSM (NSF) requirements for inpatient nursing units as indicated on Forms 3A through 3D, item 2 as in Step 4.1.1. The following comments apply to specific rooms or areas:

- Clean Holding Room. It is assumed that the clean holding room will be part of a system for the temporary storage and prompt distribution of clean and sterile supplies (i.e., daily or twice weekly). Clean linen may be stored in an alcove if a closed cart system is used. If a clean workroom is to be programmed with a work counter, handwashing sink, and fixed storage facilities, the space calculated should be increased, depending on the amount of supplies to be stored and the distribution schedule.

- Soiled Holding Room. It is assumed that the soiled holding room will be part of a system for the collection and prompt disposal of soiled materials. This room should include a handwashing sink, waste receptacle, and a soiled linen receptacle at a minimum. If a soiled workroom is to be programmed with a clinical sink and work counter as well, then an additional 1.9 NSM (2.0 NSF) should be programmed.

- Medication Center. Space should be provided for the prompt and convenient 24-hour distribution of medication to patients. A medication room or alcove, a self-contained medicine dispensing unit, or any other approved system may be used. A medication room should include a work counter, refrigerator, and locked storage and be under the nursing staff's visual control. A self-contained medicine dispensing unit may be combined with the nursing station or the clean supply workroom as long as it is under direct control of the nursing or pharmacy staff.

- Nourishment Center. This space should contain a handwashing sink, equipment for serving nourishments between scheduled meals, refrigerator, storage facilities, and an icemaker/dispenser unit to provide ice for patients. This area could be combined with the clean workroom.

- Equipment Storage. The size of this storage area will vary depending on the type of patients, but will generally include equipment items such as inhalators, I.V. stands, air mattresses, and walkers.

- Stretcher/Wheelchair Alcoves. Parking areas for stretchers and wheelchairs should be programmed specifically to avoid interference with patient, staff, and visitor traffic.

- Patient/Visitor Lounge. Patient/visitor lounge areas for more than one nursing unit may be combined. However, certain types of patients (e.g., post-partum nursing units) should be provided with lounge areas for their exclusive use.

- Emergency Equipment Holding. Space should be provided for emergency equipment such as a "crash cart" under direct control of the nursing staff (e.g., contiguous to the nursing station).

- Patient Bath/Shower. Approximately one bathtub or shower should be provided for every 12 patient beds which do not include bathing facilities within the patients' rooms. For post-partum nursing units, at least one shower should be provided for every 12 beds. Each bathtub or shower should be in an individual enclosed area with space for drying and dressing.

- Patient Sitz Bath. Each post-partum nursing unit should be provided with at least one sitz bath in an individual enclosed area with space for drying and dressing if not included as part of the patients' rooms.

- Janitor Closet. An area for the use of the housekeeping staff in maintaining the nursing units should be provided which includes a floor receptor or service sink and storage space for equipment and supplies.

4.2.2 - Calculate the support space NSM (NSF) requirements for newborn nurseries as indicated on Form 3E, item 2. The following comments apply to specific rooms or areas:

- Clean Workroom/Charting Area. Each nursery should be provided with a connecting workroom which may be combined with the scrub/gown entry alcove for staff and housekeeping personnel. The clean workroom/charting area should include a work counter, refrigerator, handwashing lavatory or sink, and charting and storage facilities. A single clean workroom may serve several nurseries depending on their location. A workroom serving a special care nursery can be omitted if equivalent facilities are provided within the nursery. In this case, the scrub/gown area should be located near the entrance to the nursery apart from the work area.

- Formula Room. If a commercial infant formula is used, the clean workroom may be used for the storage and handling of formula or another clean area of the hospital equipped with a work counter, handwashing sink, and storage facilities may be used.

  If formula is prepared on-site, a separate room should be programmed which contains a handwashing lavatory or sink, refrigerator, hot plate, work counter, formula sterilizer, and storage facilities. This room may either be located adjacent to the nurseries or elsewhere in the hospital. It is assumed that separate cleanup facilities for washing and sterilizing bottles and other supplies would be programmed in a central processing area.

- Feeding Room. A separate room may be provided for instruction, demonstration, and breast feeding of infants by mothers.

4.3 - ADMINISTRATIVE AREAS

4.3.1 - Calculate the administrative space NSM (NSF) requirements for inpatient nursing units as indicated on Forms 3A through 3D, item 3. The following comments relate to specific rooms or areas:

- Nursing Station. Space should be provided for charting, storage of administrative supplies, and handwashing facilities. Either a nursing station should be programmed or an administrative control center with team conference centers.

- Administrative Control Center. A single administrative control center should be programmed per nursing floor by combining the programmed areas for various nursing units. This allows a central area for administrative activities, including a communication system and administrative supply storage.

- Team Conference Center. Space should be provided for charting and team conferences, as well as handwashing facilities.

4.4 - SUMMARY

4.4.1 - Sum the NSM (NSF) subtotals for the primary activity rooms, support areas, and administrative areas (Form 3).

4.4.2 - Convert the total detailed NSM (NSF) space required to FGSM (FGSF) by multiplying the NSM (NSF) by 1.55.

For newborn nurseries, convert the total NSM (NSF) space required to DGSM (DGSF) by multiplying the NSM (NSF) by 1.40.

4.4.3 - Compare the GSM (GSF) obtained from the detailed calculations in step 4.4.2 (Form 3) with the range of GSM (GSF) determined in Step 3.1. (Form 2).

4.4.4 - If the detailed calculation of space is significantly larger than the range determined in Step 3.1, go back through the methodology, starting at Step 4, making adjustments as appropriate. The detailed calculation of GSM (GSF) may be slightly larger to accommodate administrative areas. This is an administrative policy decision. It should be supported with adequate documentation of qualifying considerations in Form 1.

DESIGN CONSIDERATIONS

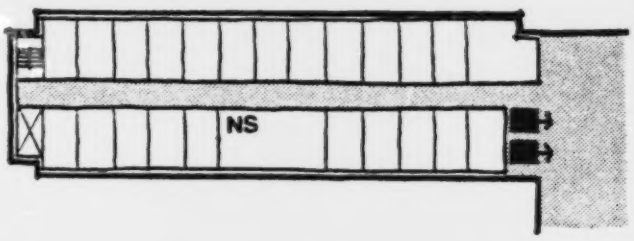
The use of the methodology described will generate a reliable space program for various inpatient nursing units. However, the best space program will not ensure that a unit will ultimately perform as desired. To achieve optimum operations, the programming/design team must consider the implications of various design configurations and the functional relationships both between spaces within the nursing unit and between interacting departments.

NURSING UNIT DESIGN

Many studies have been performed on the efficiency of nursing unit design. However, few of these studies have been very objective and more commonly the person performing the study has a bias toward one particular design or is using the study as a vehicle to expand on the merits of a design which the writer feels is the perfect nursing unit design. Also few of these studies actually compare two identical units (same number and type of beds, support facilities, and other features) while examining differences in shape (i.e., comparing a new circular nursing unit with 14 beds to an old remodelled unit which was originally intended for some other use). The following discussion will highlight some of the key advantages and disadvantages of various unit configurations.

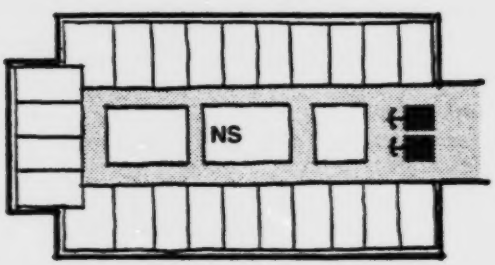
Single Corridor Nursing Unit

This is the most common type of nursing unit in Canada and the United States today. The major advantages are that it has a simple circulation pattern, allows for very good corridor supervision, and is adaptable to almost every method of delivery of care. It is less expensive to construct and requires a minimum of gross square meters (feet) per bed. However, with such a lineal arrangement, the efficient size of the unit is limited, particularly if all or a large proportion of single patient rooms are planned.



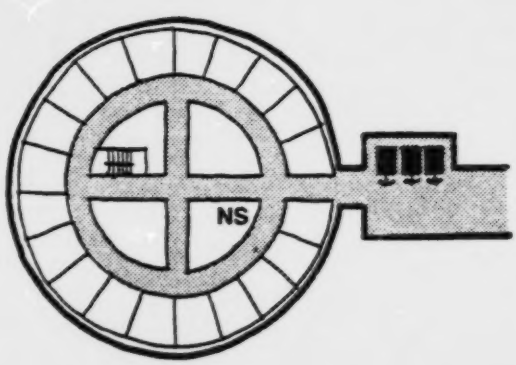
Double Corridor Nursing Unit

This is one of the most efficient nursing unit designs. The nursing station can be located to divide a 40-bed unit in half during the day shift, and then the two units combine for night-time supervision to reduce staffing costs. This design also provides the maximum number of beds opposite the nursing station. The essential design feature in the efficiency of this unit is the width of the central core, which should be less than 6.1 meters (20 feet). As the width of the core grows in size, the distance between the two sides of the nursing unit also grows to the point that two nursing units evolve, one on either side of the core. This lowers the unit's efficiency drastically since two smaller units are created whose patient rooms are strung along one side of a corridor.



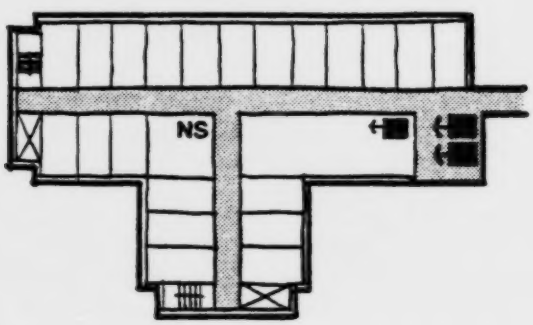
Circular Nursing Unit

Many claims have been made about the efficiency of this type of unit, but compared with other nursing unit configurations this design has many disadvantages. In the design illustrated, very poor control from the central nursing station is maintained; however, the greatest problem is that in order to provide enough patient rooms at the perimeter to make operations cost-effective, the center support space becomes excessively large. Also, "pie-shaped" patient rooms are difficult to furnish and many patients have orientation problems to this type of space compared with typically rectangular rooms. Finally, this type of unit has the highest construction cost and is difficult to convert to other types of non-patient care related activities if future changes occur.



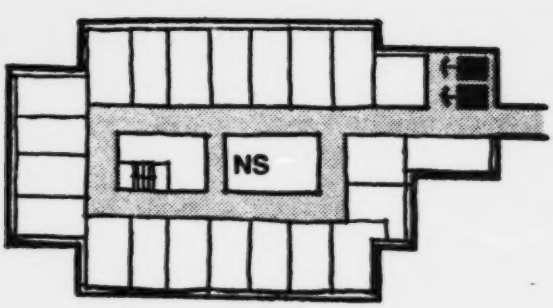
T-Shaped Nursing Unit

The main advantage of this type of design is the location of the nursing station more central to the patient rooms, although there are many variations to this design. Staffing of the unit becomes difficult because this configuration does not present a logical division for different staffing patterns.



Compact Rectangular Nursing Unit

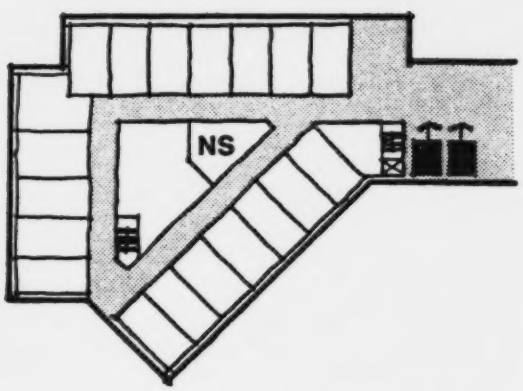
This unit is perhaps the most efficient in terms of minimizing walking distances as a result of wrapping the patient rooms around both ends of the unit, and relatively inexpensive to construct. However, the unit does not allow the very direct and easy circulation of the standard double corridor nursing unit with another symmetrical nursing unit attached.



Triangular Nursing Unit

The triangular nursing unit combines the efficiencies of the rectangular nursing units with the higher construction cost and expansion difficulties of the circular nursing unit.

In evaluating various nursing unit configurations, it is important to note that whatever the design chosen, the method of delivery of care of the particular unit and the projected staffing patterns described in the functional program should be considered. However, at the same time the unit should be designed for maximum future flexibility in mode of operation and the type of patients served.



PATIENT FLOW

The flow of a patient through the hospital begins when the admission is scheduled. However, no two systems for processing patients will be identical from hospital to hospital. The following paragraphs will describe the most typical patient flow through the hospital, although the use of electronic data processing is becoming more common for simplifying the data collection and transmission activity from one department to another.

Commonly, a physician's office contacts the admitting function to schedule, or book, an admission. If the patient is to have surgery, admitting schedules the admission for the first day when both a bed and surgical facilities will be available. Once the admission date is selected, admitting enters information about the patient on a booking sheet. This information includes expected date of admission, patient name and telephone number, admitting physician, and admitting diagnosis.

Patients may also be admitted through the emergency department. In life-or-death situations, patients are admitted as soon as possible. If a bed is not immediately available, the patient is held in the emergency department until one is found. In the event a bed is not

available for a scheduled admission, admitting may call the patient and cancel the admission. Such a cancellation is usually caused by one of two factors. Either fewer beds are available than admitting had estimated or an expected patient discharge does not materialize because a bed will be occupied for another day.

Preadmission

After a patient has been scheduled for admission, preadmission activities may take place. The patient is contacted to gather as much admitting information as possible before the patient actually arrives at the hospital. Contact may be by a mailed questionnaire or a telephone call.

Admission

When the patient arrives to be admitted, an admitting form is commonly completed. In addition to stating the reason (i.e., admitting diagnosis) for the admission, this form also contains demographic information (name, age, sex, date of birth, etc.) and financial information. The admitting form is the prime document used to notify all affected departments that this particular patient has arrived and will be in a certain bed.

One copy of the form usually goes to the nursing station for insertion in the patient's chart. This copy becomes a permanent part of the patient's medical record. Other personnel who may receive copies are finance, dietary, information desk, and surgery (to give surgeons and anesthesiologists information). In addition, other notifications, with selected information about the patient, may be prepared and sent to such departments as social service, health records (to allow the department to enter the patient into the locator file), and housekeeping.

Patient Reports

After the patient is admitted, he or she will appear on the midnight census, a daily listing of patients sorted by nursing station. This is generally accurate as of midnight and is distributed before 7:00 a.m. to a large number of hospital departments. The midnight census shows room and bed number, patient number, and date of admission as well as other information. Another common census report shows in alphabetical order all patients admitted, discharged, and transferred on the previous day.

Census information is compiled by health records for the purpose of generating statistical reports. The most common is the nursing section's daily report on hospital occupancy.

Patient Tests

The final part of the admission process is rendering admission tests. For most admissions, this involves collecting samples for lab work and taking x-rays, although other admitting tests may also be part of the process. The patient may be sent to the appropriate departments before being sent to his/her room or the patient may be taken to his/her room and then transported to the appropriate departments. For some surgical admissions, an electrocardiogram is often part of the normal workup.

Transfers

When a patient is transferred from one bed to another, the nursing station is responsible for notifying all departments that require information on the patient's location. The nursing station completes a transfer notification which goes to such departments as admitting and housekeeping.

Other departments which need to know about the transfer (e.g., dietary, information desk and other clinical departments) may get copies of the transfer notice; or may wait until the next midnight census is available.

Discharge

When the patient is discharged, the nursing station advises the same departments that are notified in room transfer situations. It also notifies admitting that a particular bed can be put back into use and signals admitting to remove the patient from the midnight census.

Preparing the Census

When admitting prepares the midnight census, the previous day's census is used as a master sheet. As patients are admitted, and as transfer and discharge notices are received, the master is changed to reflect the hospital's current occupancy pattern. In addition, the nursing stations telephone in corrections after reviewing the last day's census. With a computerized census--batch or online--an alphabetic census can be generated.

INTRADEPARTMENTAL RELATIONSHIPS

In most areas, patient room sizes are dictated by codes and standards, but it is important not to attempt to plan these rooms too compactly due to future changes in medical practice and changing uses of rooms over time. Each patient room should be equipped with an audio-visual nurse call system, a patient wardrobe and supply cabinet, piped oxygen, and piped suction. Every room should have a minimum of an

adjoining toilet room with a handwashing lavatory and a water closet, with provisions for bed pan cleansing, and some hospitals may include either a bathtub or a shower as well. A number of design variations exist for the placement of the toilet room relative to the position of the patient bed(s), outside window wall, and interior corridor wall. These options vary with the desire for better visual surveillance of the patient's bed from the corridor (e.g., pediatric units), the importance of minimizing the patient room width to obtain an optimal number of rooms placed lineally while reducing overall walking distance, and/or the construction budget. Other factors influencing the layout/design of the patient room are the materiel distribution system (i.e., centralized versus decentralized with nurservers) and the method of delivery of care, which may dictate whether a nurse charting/work alcove would also be provided in each patient room.

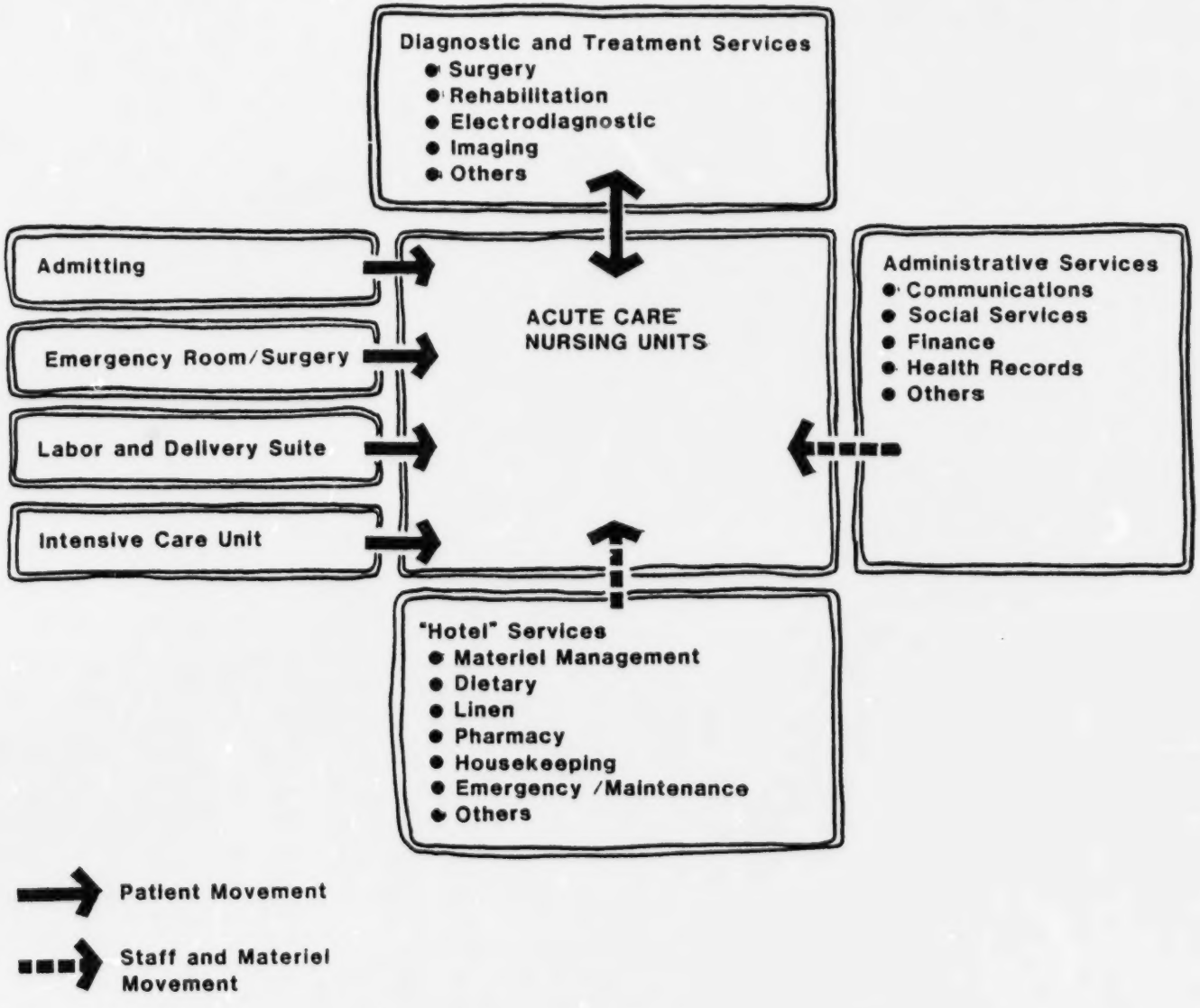
INTERDEPARTMENTAL RELATIONSHIPS

Due to the unique nature of inpatient nursing services, this department must interact with nearly every other hospital department. The key point is, however, that various nursing units should be centralized as much as possible and that functions which require an "important" interaction be contiguous, whether horizontally or vertically (i.e., surgical nursing unit near surgery, post-partum nursing unit and newborn nurseries near the labor and delivery suite, etc.). The support or "hotel" services should be centrally located to serve all nursing units, and easy access to various diagnostic and treatment ancillaries from the nursing units should be provided.

Figure 5 on the following page illustrates the major interdepartmental functional relationships for inpatient nursing units.

FIGURE 5

INTERDEPARTMENTAL FUNCTIONAL RELATIONSHIPS



appendices

APPENDIX A
PATIENT CLASSIFICATION SYSTEMS

Conceptually, patient care services are determined by the clients who are served. The quantity of medical-nursing intervention, the sophistication of equipment employed, the quantity of bedside supplies and devices utilized and, therefore, the primary activity space is derived from the patient's requirements for care. The classification of all inpatients on the basis of acuity is most commonly used as a method of quantifying workload in order to appropriately allocate nursing resources. These classification systems can also be utilized by programmers to identify and quantify unmet needs for special care beds. A general discussion of patient classification systems is presented below to acquaint programmers with the concept and various approaches available for using the classification system as a determinant of patient acuity.

Many different patient classification systems have been used and described in the literature (see "References" section). Key (1971) described several patient classification systems dating as early as 1947. Priver and Peltzie (1974) also discussed several patient classification systems. The degree of complexity has varied widely. To be practical for routine data collection, however, the classification system must be simple and reasonably descriptive, as well as being valid and reliable.

The typical patient classification system has from three to five categories. Systems with more categories are infrequent and usually cumbersome to use. Some examples are:

[White, et. al., 1967]	[Abdellah and Meyer,*]	[MacDonnel and Murray, 1965]
1. Self care	1. Preventative	1. Intensive, acute
2. Intermediate	2. Restorative	2. Intermediate
3. Intensive	3. Remedial	3. Convalescent
	4. Sustainal	4. Investigative

*Date unknown.

[The Christ Hospital, 1975]

1. Minimal self care
2. Intermediate care
3. Modified intensive care
4. Intensive care

[Flagle, 1960]

1. Self care
2. Intermediate
3. Intensive

[Misericordia Hospital, 1977]

1. Basic, self care
2. Supervised self care
3. Staff initiated/ performed
4. Intermediate
5. Comprehensive

A patient's classification represents the patient's overall condition. The classification is based on several patient characteristics, which range from highly subjective to very specific. More specific characteristics have less observer variation. Hence, a trade-off exists between repeatability or low observer variance and the range of patient needs included.

Examples of characteristics used to determine a patient's classification are:

[Claussen, 1955]

1. Nursing procedural requirements
2. Physical restrictions of the patient
3. Instructional needs of the patient
4. Emotional needs of the patient

[White, et. al., 1967]

1. Temperature and/or blood pressure frequency
2. Oxygen therapy
3. Suction
4. Bath support
5. Dietary support

[Tibbits,*]

1. Physical and hygienic activities
2. Observation of physical phenomena
3. Medications and/or treatments
4. Instructional needs
5. Diagnostic and therapeutic tests
6. Observation of the patient's reaction toward his illness

[The Christ Hospital, 1975]

1. General health
2. Activities of daily living; eating, bathing, etc.; ambulation, activity, elimination
3. Emotional status and behavior patterns
4. Treatments and medications
5. Teaching of patient and/or family

A patient may receive an intensive level of care for one of the factors, but not be considered to need intensive care overall. Certain patients may require intensive levels of care but not be candidates for special care units because of terminal prognoses. Therefore, it is important for the programmers to carefully evaluate any results of patient acuity measurement systems when allocating special care beds.

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*Date unknown.

PATIENT CLASSIFICATION SYSTEMS REFERENCES

Aydelotte, Myrtle K., Ph.D. Nurse Staffing Methodology: A Review and Critique of Selected Literature. U.S. Department of Health, Education and Welfare, January, 1973.

Chagnon, M., Audette, L., and Tilquin, C. "Patient Classification by Care Required," Dimensions in Health Service, September 1977, p. 32-35.

Finlayson, H. "The NUMBRS Approach to Nursing Management," Dimensions in Health Service, May, 1976, p. 39-44.

Giovannetti, Phyllis. "Understanding Patient Classification Systems," Journal of Nursing Administration, February, 1979.

Grace Hospital, Inc. Meyers, Diane, Project Director. "Grace-Reynolds Application and Study of PETO." Morganton, North Carolina: Kate B. Reynolds Health Care Trust Grant to Grace Hospital, Inc., 1973-76.

Heieren, E. Staffing to Meet Patient Needs. Saskatchewan Registered Nurses' Association Workshop, 1971.

Homlund, B. A. "Nursing Study - Phase I," Hospital Systems Study Group. University of Saskatchewan, Saskatoon, Saskatchewan, Canada, September, 1967.

Overton, P., Harrison, F., and Stinson, S. "Patient Classification by Types of Care," Dimensions in Health Service, August, 1977, p. 27-30.

Misericordia Hospital, "Nursing Services Information System," an unpublished paper by the Research and Development Department of the Misericordia Hospital, Edmonton, Alberta, Canada, 1975.

Peltzie, Kenneth G. and Priver, J lien, M.D. Continued Care and Cost Containment. Brochure by W. K. Kellog Foundation, June, 1974.

Plummer, J. "Patient Classification Proves Staffing Needs," Dimensions in Health Service, May, 1976, p. 36-38.

Ryan, T., Barker, B., and Marciante, F. A. "A System for Determining Appropriate Nurse Staffing," Journal of Nursing Administration, June, 1975, p. 30-38.

Tilquin, C. "Patient Classification Does Work," Dimensions in Health Service, January, 1976, p. 12-14.

Trivedi, Vandankumar M. Daily Allocation of Nursing Resources. From Cost Controls in Hospitals (Griffith, Hancock and Munson), 1976.

White, Ruth Preston, Quade, Dana, and White, Kerr L. Patient Care Classification: Methods and Application. Research Report (NU00080) Bureau of Health Manpower, USPHS, July, 1967.

APPENDIX B
FUNCTIONAL AREAS

General functional areas of the various inpatient nursing units are listed on the following pages. These have been grouped according to the three categories: primary activity areas, support areas, and administrative areas. It is to be noted that all of the functional areas listed will not necessarily be included in a given hospital. The functional areas to be included in a specific unit should be a direct outcome of the approved functional program.

MEDICAL/SURGICAL NURSING UNITS

PRIMARY ACTIVITY AREAS

- Private Patient Room
- Semiprivate Patient Room
- Isolation Room
- Exam/Treatment Room

SUPPORT AREAS

- Clean Supply Holding Room
- Soiled Holding Room
- Medication Center
- Nourishment Center
- Equipment Storage
- Stretcher/Wheelchair Alcove
- Patient/Visitor Lounge
- Emergency Equipment Holding
- Patient Bath/Shower
- Patient Sitz Bath
- Janitor Closet

ADMINISTRATIVE AREAS

- Nursing Station
- Administrative Control Center
- Team Conference Center
- Physician Dictation
- Head Nurse Office
- Secretarial/Clerical Work Area
- Staff Lounge
- Male Staff Toilet
- Male Staff Lockers/ Changing Room
- Female Staff Toilet
- Female Staff Lockers/ Changing Room
- Conference Room

PEDIATRIC NURSING UNITS

PRIMARY ACTIVITY AREAS

- Private Patient Room
- Semiprivate Patient Room
- Isolation Room
- Exam/Treatment Room

SUPPORT AREAS

- Admission/Family Room
- Clean Supply Holding Room
- Soiled Holding Room
- Medication Center
- Nourishment Center
- Equipment Storage
- Stretcher/Wheelchair Alcove
- Patient/Visitor Lounge
- Emergency Equipment Holding
- Patient Classroom
- Playroom
- Patient Bath/Shower
- Janitor Closet

ADMINISTRATIVE AREAS

- Nursing Station
- Administrative Control Center
- Team Conference Center
- Physician Dictation
- Head Nurse Office
- Secretarial/Clerical Work Area
- Staff Lounge
- Male Staff Toilet
- Male Staff Lockers/ Changing Room
- Female Staff Toilet
- Female Staff Lockers/ Changing Room
- Conference Room

PSYCHIATRIC NURSING UNITS

PRIMARY ACTIVITY AREAS

- Private Patient Room
- Semiprivate Patient Room
- Seclusion Room
- Exam/Treatment Room

SUPPORT AREAS

- Clean Supply Holding Room
- Soiled Holding Room
- Medication Center
- Nourishment Center
- Equipment Storage
- Stretcher/Wheelchair Alcove
- Patient/Visitor Lounge
- Patient Dining Area
- Patient Laundry Room
- Recreation/Activity Room
- Group Therapy Room
- Interview/Consultation Room
- Television/Music Room
- Patient Bath/Shower
- Occupational Therapy Room
- Janitor Closet

ADMINISTRATIVE AREAS

- Nursing Station
- Physician Dictation
- Head Nurse Office
- Secretarial/Clerical Work Area
- Staff Lounge
- Male Staff Toilet
- Male Staff Lockers/ Changing Room
- Female Staff Toilet
- Female Staff Lockers/ Changing Room
- Conference Room

OBSTETRICAL NURSING UNITS

PRIMARY ACTIVITY AREAS

- Private Patient Room
- Semiprivate Patient Room
- Isolation Room
- Exam/Treatment Room

SUPPORT AREAS

- Clean Supply Holding Room
- Soiled Holding Room
- Medication Center
- Nourishment Center
- Equipment Storage
- Stretcher/Wheelchair Alcove
- Patient/Visitor Lounge
- Emergency Equipment Holding
- Feeding Room
- Education/Family Conference Room
- Patient Bath/Shower
- Patient Sitz Bath
- Janitor Closet

ADMINISTRATIVE AREAS

- Nursing Station
- Administrative Control Center
- Team Conference Center
- Physician Dictation
- Head Nurse Office
- Secretarial/Clerical Work Area
- Staff Lounge
- Male Staff Toilet
- Male Staff Lockers/ Changing Room
- Female Staff Toilet
- Female Staff Lockers/ Changing Room
- Conference Room

NEWBORN NURSERIES

PRIMARY ACTIVITY AREAS

- Newborn Nursery
- Special Care Nursery
- Exam/Treatment Area

SUPPORT AREAS

- Scrub/Gown Entry Alcove
- Clean Workroom/Charting Area
- Soiled Holding
- Equipment Storage Alcove
- Formula Room
- Feeding Room
- Janitor Closet

ADMINISTRATIVE AREAS

- Head Nurse Office
- Secretarial/Clerical Work Area
- Staff Lounge
- Male Staff Toilet
- Male Staff Lockers/ Changing Room
- Female Staff Toilet
- Female Staff Lockers/ Changing Room
- Conference Room

APPENDIX C
METHODOLOGY FORMS

FORM 1
REFERENCE SHEET

This reference sheet is to serve as a convenient means for accumulating and maintaining project background information. Projects will occasionally extend over longer periods of time than anticipated, in which case, the bases for early assumptions and calculations may be lost or forgotten. documenting relevant information on these sheets will avoid such problems. Back-up calculations should also be maintained.

1.0 ESTIMATE OF TOTAL MEDICAL/SURGICAL BED NEED:

- The Total Medical/Surgical bed requirement is: [ ]

  The year as the planning horizon is 19___.

  The approaches utilized to determine bed need were:

  _____

  _____

  _____

- The number of medical/surgical nursing units programmed are as follows:

UNIT	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	METHOD OF DELIVERY OF CARE*

*As in functional, team, primary, modular or some combination of these methodologies.

2.0 ESTIMATE OF TOTAL PEDIATRIC BED NEED (if justified):

- The Pediatric bed requirement is: [ ]

  The year used as the planning horizon is 19___.

  The approach utilized to determine bed need was:

  _____

  _____

  _____

- The number of pediatric nursing units programmed are as follows:

UNIT REFERENCE	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	UNIT ORGANIZATION

3.0 ESTIMATE OF PSYCHIATRIC BED NEED (if justified):

- The Psychiatric bed requirement is: [ ]

  The year used as the planning horizon is 19___.

  The approach utilized to determine bed need was:

  _____

  _____

  _____

- The number of psychiatric nursing units programmed are as follows:

UNIT REFERENCE	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	UNIT ORGANIZATION

4.0 ESTIMATE OF OBSTETRICAL BED NEED (if justified):

- The Obstetrical bed requirement is: ☐

  The year used as the planning horizon is 19___.

  The approach utilized to determine bed need was:

  _____

  _____

  _____

- The number of obstetrical nursing units programmed are as follows:

UNIT REFERENCE	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	UNIT ORGANIZATION

5.0 ESTIMATE OF NEWBORN NURSERY BASSINETS:

- The Newborn Nursery bassinet requirement is: [ ]

The year used as the planning horizon is 19____.

The approach utilized to determine bed need was:

_____

_____

_____

6.0 ASSUMPTIONS UPON WHICH INPATIENT BED NEED WAS BASED WERE:

_____

_____

_____

_____

_____

_____

7.0 QUALIFIERS TO IDENTIFIED ASSUMPTIONS IN PLANNING INPATIENT NURSING UNIT(S) AND NEWBORN NURSERIES INCLUDE THE FOLLOWING:

_____

_____

_____

_____

_____

_____

_____

_____

FORM 2
PRELIMINARY SPACE ESTIMATE

1. MEDICAL/SURGICAL NURSING UNITS

Total medical/surgical bed need	= _____ beds	= _____ beds
☐ All private rooms	x 32.6 (350)	x 39.5 (425)
	or	or
☐ Private and semiprivate rooms	x 30.2 (325)	x 34.9 (375)
	or	or
☐ Mostly semiprivate or multiple bed rooms	x 25.6 (275)	x 32.6 (350)
Total Medical/Surgical Nursing Unit FGSM (FGSF)*	= ☐	= ☐

2. PEDIATRIC NURSING UNITS

Total pediatric bed need	= _____ beds	= _____ beds
☐ All private rooms	x 32.6 (350)	x 39.5 (425)
	or	or
☐ Private and semiprivate rooms	x 30.2 (325)	x 34.9 (375)
	or	or
☐ Mostly semiprivate or multiple bed rooms	x 25.6 (275)	x 32.6 (350)
Total Pediatric Nursing Unit FGSM (FGSF)*	= ☐	= ☐

*Floor gross square meters (floor gross square feet). See Appendix E for further explanation.

3. PSYCHIATRIC NURSING UNITS

Total psychiatric bed need	= _____ beds			= _____ beds	
☐ All private rooms	x 41.9 (450)			x 55.8 (600)	
		or			or
☐ Private and semiprivate rooms	x 39.5 (425)			x 53.5 (575)	
		or			or
☐ Mostly semiprivate or multiple bed rooms	x 34.9 (375)			x 51.2 (550)	
Total Psychiatric Nursing Unit FGSM (FGSF)*	= ☐		TO	= ☐	

4. OBSTETRICAL NURSING UNITS

Total obstetrical bed need	= _____ beds			= _____ beds	
☐ All private rooms	x 32.6 (350)			x 39.5 (425)	
		or			or
☐ Private and semiprivate rooms	x 30.2 (325)			x 34.9 (375)	
		or			or
☐ Mostly semiprivate or multiple bed rooms	x 25.6 (275)			x 32.6 (350)	
Total Obstetrical Nursing Unit FGSM (FGSF)*	= ☐		TO	= ☐	

5. NEWBORN NURSERIES

Total newborn nursery bassinets projected	= _____			= _____	
	x 7.0 (75)			x 11.2 (120)	
Total Newborn Nursery GSM (GSF)	= ☐		TO	= ☐	

NOTE: A minimum of 55.8 (600) should be programmed for a newborn nursery (maximum of four bassinets).

*Floor gross square meters (floor gross square feet). See Appendix E for further explanation.

FORM 3A
DETAILED SPACE CALCULATIONS
(MEDICAL/SURGICAL NURSING UNITS)

1. PRIMARY ACTIVITY AREAS

A. Patient Rooms:

NSM (NSF)

☐ Private patient rooms @ 14.0 (150) = _____

- ☐ Toilets @ 3.7 (40) = _____
- ☐ Showers (optional) @ 1.9 (20) = _____
- ☐ Nurse work alcove (optional) @ 3.7 (40) = _____
- ☐ Nurserver/patient supply storage cabinet (optional) @ 0.93 (10) = _____

☐ Semiprivate patient rooms @ 21.4 (230) = _____

- ☐ Toilets @ 3.7 (40) = _____
- ☐ Showers (optional) @ 1.9 (20) = _____
- ☐ Nurse work alcove (optional) @ 3.7 (40) = _____
- ☐ Nurserver/patient supply storage cabinet (optional) @ 0.93 (10) = _____

☐ Isolation rooms @ 14.0 (150) = _____

- ☐ Toilets @ 3.7 (40) = _____
- ☐ Anterooms @ 3.7 (40) = _____
- ☐ Showers (optional) @ 1.9 (20) = _____
- ☐ Nurserver/patient supply storage cabinet (optional) @ 0.93 (10) = _____

B. Exam/Treatment Room (optional): 1 @ 14.0 (150) = _____

C. Subtotal Primary Activity Areas (Add Lines 1A and 1B) = _____

2. SUPPORT AREAS

NSM (NSF)

A. Clean Supply Holding Room: _____ beds @ 0.47 (5) = _____
11.2 (120) min.
18.6 (200) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets, reduce clean supply room space by 20%. The programmed clean supply space for various nursing units on the same floor level may then be combined into a central area.

B. Soiled Holding Room: _____ beds @ 0.23 (2.5) = _____
7.4 (80) min.
9.3 (100) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets reduce soiled holding room space by 20%. The programmed soiled holding space for various nursing units on the same floor level may then be combined into a central area.

C. Medication Center: 1 @ 4.7 (50) = _____

Note: If a self-contained medicine dispensing unit is located at the nursing station, omit this space and increase the programmed nursing station space by 2.8 (30).

D. Nourishment Center: 1 @ 5.6 (60) = _____

E. Equipment Storage: _____ beds @ 0.23 (2.5) minimum = _____

Note: Equipment storage varies with the type of patients on the unit (e.g., orthopedic patients require traction equipment).

F. Stretcher/Wheelchair Alcove: 2 @ 2.2 (24) = _____

G. Patient/Visitor Lounge: _____ beds @ 1.4 (15) = _____

Note: Add 14.0 (150) if this is the only patient/visitor lounge on the floor.

H. Emergency Equipment Holding: 1 @ 1.9 (20) = _____

Note: Should be contiguous with the nursing station.

NSM (NSF)

I. Patient Bath/Shower: one bathtub or shower per 12 beds @ 2.8 (30) = _____

Note: If bathtubs or showers are combined with a patient toilet (i.e., lavatory and water closet), reduce space per bathtub or shower to 1.9 (20). If patient rooms are provided with contiguous bathtubs or showers, provide only one shared bathtub and one shower per nursing unit.

J. Patient Sitz Bath (optional): _____ @ 2.8 (30) = _____

K. Janitor Closet: 1 @ 3.7 (40) = _____

L. Other (itemize):

_____ = _____

_____ = _____

M. Subtotal Support Areas (add Lines 2A through 2L) = _____

3. ADMINISTRATIVE AREAS

A. Nursing Station (optional): _____ beds @ 0.47 (5) = _____

B. Administrative Control Center (optional): _____ beds @ 0.28 (3) = _____

Note: Combine the space programmed above with other nursing units on the same floor level into one central area.

NSM (NSF)

C. Team Conference Center (optional): 1 @ 9.3 (100) = _____

D. Physician Dictation (optional): _____ booths @ 1.4 (15) = _____

E. Head Nurse Office (optional):

_____	Private office @ 11.2 (120)	=	
_____	Open work station @ 5.6 (60)	=	
_____	TOTAL		= _____

F. Secretarial/Clerical Work Area (optional):

_____	Private office @ 9.3 (100)	=	
_____	Open work station @ 5.6 (60)	=	
_____	Seats for waiting/reception @ 1.4 (15)	=	
_____	Files @ 0.56 (6)	=	
_____	TOTAL		= _____

G. Staff Lounge (optional):

_____	Maximum seating capacity @ 1.4 (15)		= _____
			9.3 (100) min.

H. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	
_____	Lavatory(s) @ 1.4 (15)	=	
_____	Urinal(s) @ 1.4 (15)	=	
_____	TOTAL		= _____
			4.2 (45) min.

I. Male Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	
_____	Lockers (half length) @ 0.47 (5)	=	
_____	Lockers (box/purse) @ 0.28 (3)	=	
_____	TOTAL		= _____
			5.6 (60) min.

NSM (NSF)

J. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	_____
_____	Lavatory(s) @ 1.4 (15)	=	_____
	TOTAL		_____

= 4.2 (45) min.

K. Female Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	_____
_____	Lockers (half length) @ 0.47 (5)	=	_____
_____	Lockers (box/purse) @ 0.28 (3)	=	_____
	TOTAL		_____

= 5.6 (60) min.

L. Conference Room (optional):

_____ Maximum seating capacity @ 1.4 (15) = 9.3 (100) min.

M. Other (itemize):

_____ = _____

_____ = _____

N. Subtotal Administrative Areas (add Lines 3A through 3M) = _____

4. SUMMARY

		NSM (NSF)
A.	Total Primary Activity Areas (Line 1C)	=
B.	Total Support Areas (Line 2M)	=
C.	Total Administrative Areas (Line 3N)	=
D.	Total NSM (NSF)	=
		x 1.55
E.	Total FGSM (FGSF)	=

FORM 3B
DETAILED SPACE CALCULATIONS (PEDIATRIC NURSING UNITS)

1. PRIMARY ACTIVITY AREAS

NSM (NSF)

A. Patient Rooms:

☐ Private patient rooms @ 14.0 (150) = _____

- ☐ Toilets @ 3.7 (40) = _____
- ☐ Showers (optional) @ 1.9 (20) = _____
- ☐ Nurse work alcove (optional) @ 3.7 (40) = _____
- ☐ Nurserver/patient supply storage cabinet (optional) @ 0.93 (10) = _____

☐ Semiprivate patient rooms @ 21.4 (230) = _____

- ☐ Toilets @ 3.7 (40) = _____
- ☐ Showers (optional) @ 1.9 (20) = _____
- ☐ Nurse work alcove (optional) @ 3.7 (40) = _____
- ☐ Nurserver/patient supply storage cabinet (optional) @ 0.93 (10) = _____

☐ Isolation rooms @ 14.0 (150) = _____

- ☐ Toilets @ 3.7 (40) = _____
- ☐ Anterooms @ 3.7 (40) = _____
- ☐ Showers (optional) @ 1.9 (20) = _____
- ☐ Nurserver/patient supply storage cabinet (optional) @ 0.93 (10) = _____

B. Exam/Treatment Room (optional): 1 @ 14.0 (150) = _____

C. Subtotal Primary Activity Areas (Add Lines 1A and 1B) = _____

2. SUPPORT AREAS

NSM (NSF)

A. Admission/Family Room (optional): 1 @ 9.3 (100) = _____

B. Clean Supply Holding Room: _____ beds @ 0.47 (5) = _____

11.2 (120) min.
18.6 (200) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets reduce clean supply room space by 20%. The programmed clean supply space for various nursing units on the same floor level may then be combined into a central area.

C. Soiled Holding Room: _____ beds @ 0.23 (2.5) = _____

7.4 (80) min.
9.3 (100) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets, reduce soiled holding room space by 20%. The programmed soiled holding space for various nursing units on the same floor level may then be combined into a central area.

D. Medication Center: 1 @ 4.7 (50) = _____

Note: If a self-contained medicine dispensing unit is located at the nursing station, omit this space and increase the programmed nursing station space by 2.8 (30).

E. Nourishment Center: 1 @ 5.6 (60) = _____

F. Equipment Storage: _____ beds @ 0.23 (2.5) minimum = _____

Note: Equipment storage varies with the type of patients on the unit (e.g., orthopedic patients require traction equipment).

G. Stretcher/Wheelchair Alcove: 2 @ 2.2 (24) = _____

NSM (NSF)

H. Patient/Visitor Lounge: _____ beds @ 1.4 (15) = 11.2 (120) min.

Note: Add 14.0 (150) if this is the only patient/visitor lounge on the floor.

I. Emergency Equipment Holding: 1 @ 1.9 (20) = _____

Note: Should be contiguous with the nursing station.

J. Patient Classroom (optional): _____ maximum seating capacity @ 1.1 (12) = _____

K. Playroom: _____ beds @ 1.9 (20) = 14.0 (150) min.

L. Patient Bath/Shower: one bathtub or shower per 12 beds @ 2.8 (30) = _____

Note: If bathtubs or showers are combined with a patient toilet (i.e., lavatory and water closet), reduce space per bathtub or shower to 1.9 (20). If patient rooms are provided with contiguous bathtubs or showers, provide only one shared bathtub and one shower per nursing unit.

M. Janitor Closet: 1 @ 3.7 (40) = _____

N. Other (itemize):

_____ = _____

_____ = _____

O. Subtotal Support Areas (add Lines 2A through 2N) = _____

3. ADMINISTRATIVE AREAS

A. Nursing Station (optional): _____ beds @ 0.47 (5) = _____

NSM (NSF)

B. Administrative Control Center (optional): _____ beds @ 0.28 (3) = _____

Note: Combine the space programmed above with other nursing units on the same floor level into one central area.

C. Team Conference Center (optional): 1 @ 9.3 (100) = _____

D. Physician Dictation (optional): _____ booths @ 1.4 (15) = _____

E. Head Nurse Office (optional):

_____	Private office @ 11.2 (120)	=	_____
_____	Open work station @ 5.6 (60)	=	_____
_____	TOTAL		= _____

F. Secretarial/Clerical work area (optional):

_____	Private office @ 9.3 (100)	=	_____
_____	Open work station @ 5.6 (60)	=	_____
_____	Seats for waiting/reception @ 1.4 (15)	=	_____
_____	Files @ 0.56 (6)	=	_____
_____	TOTAL		= _____

G. Staff Lounge (optional):

_____	Maximum seating capacity @ 1.4 (15)		= _____
			9.3 (100) min.

H. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	_____
_____	Lavatory(s) @ 1.4 (15)	=	_____
_____	Urinal(s) @ 1.4 (15)	=	_____
_____	TOTAL		= _____
			4.2 (45) min.

NSM (NSF)

I. Male Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	_____
_____	Lockers (half length) @ 0.47 (5)	=	_____
_____	Lockers (box/purse) @ 0.28 (3)	=	_____
_____	TOTAL	_____	= _____

J. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	_____
_____	Lavatory(s) @ 1.4 (15)	=	_____
_____	TOTAL	_____	= 4.2 (45) min.

K. Female Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	_____
_____	Lockers (half length) @ 0.47 (5)	=	_____
_____	Lockers (box/purse) @ 0.28 (3)	=	_____
_____	TOTAL	_____	= 5.6 (60) min.

L. Conference Room (optional):

_____ Maximum seating capacity @ 1.4 (15) = 9.3 (100) min.

M. Other (itemize):

_____ = _____

_____ = _____

N. Subtotal Administrative Areas (add Lines 3A through 3M) = _____

4. SUMMARY

		NSM (NSF)
A. Total Primary Activity Areas (Line 1C)	=	
B. Total Support Areas (Line 20)	=	
C. Total Administrative Areas (Line 3N)	=	
D. Total NSM (NSF)	=	
	x 1.55	
E. Total FGSM (FGSF)	=	

FORM 3C
DETAILED SPACE CALCULATIONS (PSYCHIATRIC NURSING UNITS)

1. PRIMARY ACTIVITY AREAS

NSM (NSF)

A. Patient Rooms:

☐ Private patient rooms @ 14.0 (150) = _____

☐ Toilets @ 3.7 (40) = _____
☐ Showers (optional) @ 1.9 (20) = _____

☐ Semiprivate patient rooms @ 21.4 (230) = _____

☐ Toilets @ 3.7 (40) = _____
☐ Showers (optional) @ 1.9 (20) = _____

☐ Seclusion rooms (optional) @ 9.3 (100) = _____

☐ Anterooms @ 3.7 (40) = _____
☐ Toilets @ 3.7 (40) = _____

B. Exam/Treatment Room (optional): 1 @ 14.0 (150) = _____

C. Subtotal Primary Activity Areas (Add Lines 1A and 1B) = _____

2. SUPPORT AREAS

NSM (NSF)

A. Clean Supply Holding Room: _____ beds @ 0.28 (3) = 5.6 (60) min. 9.3 (100) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets, reduce clean supply room space by 20%. The programmed clean supply space for various nursing units on the same floor level may then be combined into a central area.

B. Soiled Holding Room: _____ beds @ 0.19 (2) = 5.6 (60) min. 9.3 (100) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets, reduce clean supply room space by 20%. The programmed clean supply space for various nursing units on the same floor level may then be combined into a central area.

C. Medication Center: 1 @ 4.7 (50) = _____

Note: If a self-contained medicine dispensing unit is located at the nursing station, omit this space and increase the programmed nursing station space by 2.8 (30).

D. Nourishment Center: 1 @ 5.6 (60) = _____

Note: If a larger kitchen is planned in lieu of a nourishment center, allow a minimum of 11.2 (120).

E. Equipment Storage: _____ beds @ 0.23 (2.5) minimum = _____

Note: Equipment storage varies with the type of patients on the unit (e.g. orthopedic patients require traction equipment).

F. Stretcher/Wheelchair Alcove: 1 @ 2.2 (24) = _____

G. Patient/Visitor Lounge: _____ beds @ 1.9 (20) = 11.2 (120) min.

		NSM (NSF)
H.	Patient Dining Area (optional): _____ beds @ 1.4 (15) Note: The calculation above assumes one sitting. If patients using wheelchairs/crutches will be dining allow 2.3 (25) per seat.	= 14.0 (150) min.
I.	Patient Laundry Room (optional): 1 @ 7.4 (80) minimum	= _____
J.	Recreation/Activity Room: _____ beds @ 1.9 (20)	= 18.6 (200) min.
K.	Group Therapy Room (optional): _____ rooms @ 14.0 (150) minimum	= _____
L.	Interview/Consultation Room: _____ rooms @ 9.3 (100)	= 9.3 (100) min.
M.	Television/Music Room (optional): _____ average seating capacity @ 1.1 (12) Note: If television viewing will take place, the length of the room must be at least 4.3 lineal meters (14 lineal feet).	= 11.2 (120) min.
N.	Patient Bath/Shower: one bathtub or shower per 4 beds @ 2.8 (30) Note: If bathtubs or showers are combined with a patient toilet (i.e., lavatory and water closet), reduce space per bathtub or shower to 1.9 (20). If patient rooms are provided with contiguous bathtubs or showers, provide only one shared bathtub and one shower per nursing unit.	= _____
O.	Occupational Therapy Room (optional): _____ beds @ 1.4 (15)	= 37.2 (400) min.
P.	Janitor Closet: 1 @ 3.7 (40)	= _____
Q.	Other (itemize):	
	_____	= _____
	_____	= _____
R.	Subtotal Support Areas (add Lines 2A through 2Q)	= _____

NSM (NSF)

3. ADMINISTRATIVE AREAS

A. Nursing Station: _____ beds @ 0.47 (5) = _____

B. Physician Dictation (optional): _____ booths @ 1.4 (15) = _____

C. Head Nurse Office (optional):

_____	Private office @ 11.2 (120)	=	
_____	Open work station @ 5.6 (60)	=	
_____	TOTAL		= _____

D. Secretarial/Clerical work area (optional):

_____	Private office @ 9.3 (100)	=	
_____	Open work station @ 5.6 (60)	=	
_____	Seats for waiting/reception @ 1.4 (15)	=	
_____	Files @ 0.56 (6)	=	
_____	TOTAL		= _____

E. Staff Lounge (optional):

_____	Maximum seating capacity @ 1.4 (15)	= _____

F. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	
_____	Lavatory(s) @ 1.4 (15)	=	
_____	Urinal(s) @ 1.4 (15)	=	
_____	TOTAL		= 4.2 (45) min.

NSM (NSF)

G. Male Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	_____
_____	Lockers (half length) @ 0.47 (5)	=	_____
_____	Lockers (box/purse) @ 0.28 (3)	=	_____
_____	TOTAL		= 5.6 (60) min.

H. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	_____
_____	Lavatory(s) @ 1.4 (15)	=	_____
_____	TOTAL		= 4.2 (45) min.

I. Female Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	_____
_____	Lockers (half length) @ 0.47 (5)	=	_____
_____	Lockers (box/purse) @ 0.28 (3)	=	_____
_____	TOTAL		= 5.6 (60) min.

J. Conference Room (optional):

_____	Maximum seating capacity @ 1.4 (15)	= 9.3 (100) min.

K. Other (itemize):

_____ = _____

_____ = _____

L. Subtotal Administrative Areas (add Lines 3A through 3K) = _____

4. SUMMARY

		NSM (NSF)
A. Total Primary Activity Areas (Line 1C)	=	
B. Total Support Areas (Line 2R)	=	
C. Total Administrative Areas (Line 3L)	=	
D. Total NSM (NSF)	=	
	x 1.55	
E. Total FGSM (FGSF)	=	

FORM 3D
DETAILED SPACE CALCULATIONS
(OBSTETRICAL NURSING UNITS)

1. PRIMARY ACTIVITY AREAS

		NSM (NSF)
A.	Patient Rooms:	
☐	Private patient rooms @ 14.0 (150)	=
☐	Toilets @ 3.7 (40)	=
☐	Showers (optional) @ 1.9 (20)	=
☐	N rse work alcove (optional) @ 3.7 (40)	=
☐	Nurserver/patient supply storage cabinet (optional) @ 0.93 (10)	=
☐	Semiprivate patient rooms @ 21.4 (230)	=
☐	Toilets @ 3.7 (40)	=
☐	Showers (optional) @ 1.9 (20)	=
☐	Nurse work alcove (optional) @ 3.7 (40)	=
☐	Nurserver/patient supply storage cabinet (optional) @ 0.93 (10)	=
☐	Isolation rooms @ 14.0 (150)	=
☐	Toilets @ 3.7 (40)	=
☐	Anterooms @ 3.7 (40)	=
☐	Showers (optional) @ 1.9 (20)	=
☐	Nurserver/patient supply storage cabinet (optional) @ 0.93 (10)	=
B.	Exam/Treatment Room (optional): 1 @ 14.0 (150)	=
C.	Subtotal Primary Activity Areas (Add Lines 1A and 1B)	=

2. SUPPORT AREAS

NSM (NSF)

A. Clean Supply Holding Room: _____ beds @ 0.47 (5) = 11.2 (120) min. 18.6 (200) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets, reduce clean supply room space by 20%. The programmed clean supply space for various nursing units on the same floor level may then be combined into a central area.

B. Soiled Holding Room: _____ beds @ 0.23 (2.5) = 7.4 (80) min. 9.3 (100) max.

Note: I patient rooms will have built-in nurservers/patient supply storage cabinets, reduce soiled holding room space by 20%. The programmed soiled holding space for various nursing units on the same floor level may then be combined into a central area.

C. Medication Center: 1 @ 4.7 (50) = _____

Note: If a self-contained medicine dispensing unit is located at the nursing station, omit this space and increase the programmed nursing station space by 2.8 (30).

D. Nourishment Center: 1 @ 5.6 (60) = _____

E. Equipment Storage: _____ beds @ 0.23 (2.5) minimum = _____

Note: E uipment storage varies with the type of patients on the unit (e.g., orthopedic patients require traction equipment).

F. Stretcher/Wheelchair Alcove: 2 @ 2.2 (24) = _____

G. Patient/Visitor Lounge: _____ beds @ 1.4 (15) = 11.2 (120) min.

Note: Add 14.0 (150) if this is the only patient/visitor lounge on the floor.

NSM (NSF)

H. Emergency Equipment Holding: 1 @ 1.9 (20) = _____

Note: Should be contiguous with the nursing station.

I. Feeding Room (optional): 1 @ 9.3 (100) = _____

J. Education/Family Conference Room (optional): _____ maximum seating capacity @ 1.4 (15) = _____
11.2 (120) min.

K. Patient Bath/Shower: one bathtub or shower per 12 beds @ 2.8 (30) = _____

Note: If bathtubs or showers are combined with a patient toilet (i.e., lavatory and watercloset), reduce space per bathtub or shower to 1.9 (20). If patient rooms are provided with contiguous bathtubs or showers, provide only one shared bathtub and one shower per nursing unit.

L. Patient Sitz Bath (optional): _____ @ 2.8 (30) = _____

M. Janitor Closet: 1 @ 3.7 (40) = _____

N. Other (itemize):

_____ = _____

_____ = _____

O. Subtotal Support Areas (add Lines 2A through 2N) = _____

3. ADMINISTRATIVE AREAS

A. Nursing Station (optional): _____ beds @ 0.47 (5) = _____

NSM (NSF)

B. Administrative Control Center (optional): _____ beds @ 0.28 (3) = _____

Note: Combine the space programmed above with other nursing units on the same floor level into one central area.

C. Team Conference Center (optional): 1 @ 9.3 (100) = _____

D. Physician Dictation (optional): _____ booths @ 1.4 (15) = _____

E. Head Nurse Office (optional):

_____	Private office @ 11.2 (120)	=	
_____	Open work station @ 5.6 (60)	=	_____
_____	TOTAL		_____
		=	_____

F. Secretarial/Clerical work area (optional):

_____	Private office @ 9.3 (100)	=	
_____	Open work station @ 5.6 (60)	=	_____
_____	Seats for waiting/reception @ 1.4 (15)	=	_____
_____	Files @ 0.56 (6)	=	_____
_____	TOTAL		_____
		=	_____

G. Staff Lounge (optional):

_____	Maximum seating capacity @ 1.4 (15)	=	_____
			9.3 (100) min.

H. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	
_____	Lavatory(s) @ 1.4 (15)	=	_____
_____	Urinal(s) @ 1.4 (15)	=	_____
_____	TOTAL		_____
		=	_____
			4.2 (45) min.

NSM (NSF)

I. Male Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	
_____	Lockers (half length) @ 0.47 (5)	=	
_____	Lockers (box/purse) @ 0.28 (3)	=	
_____	TOTAL		= 5.6 (60) min.

J. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	=	1.4 (15)
_____	Water closet(s) @ 1.4 (15)	=	
_____	Lavatory(s) @ 1.4 (15)	=	
_____	TOTAL		= 4.2 (45) min.

K. Female Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	=	
_____	Lockers (half length) @ 0.47 (5)	=	
_____	Lockers (box/purse) @ 0.28 (3)	=	
_____	TOTAL		= 5.6 (60) min.

L. Conference Room (optional):

_____ Maximum seating capacity @ 1.4 (15) = 9.3 (100) min.

M. Other (itemize):

_____ = _____

_____ = _____

N. Subtotal Administrative Areas (add Lines 3A through 3M) = _____

4. SUMMARY

		NSM (NSF)
A. Total Primary Activity Areas (Line 1C)	=	
B. Total Support Areas (Line 20)	=	
C. Total Administrative Areas (Line 3N)	=	
D. Total NSM (NSF)	=	
	x	1.55
E. Total FGSM (FGSF)	=	

FORM 3E
DETAILED SPACE CALCULATIONS (NEWBORN NURSERIES)

1. PRIMARY ACTIVITY AREAS

NSM (NSF)

A. Newborn Nurseries:

☐ Normal newborn bassinets @ 2.2 (24) = 11.2 (120) min.

B. Special Care Nursery (optional):

☐ Special care bassinets @ 3.7 (40) = 9.3 (100) min.

C. Exam/Treatment Area: _____ normal and special care bassinets @ 0.28 (3) = _____

D. Subtotal Primary Activity Areas (add Lines 1A through 1C) = _____

1. SUPPORT AREAS

A. Scrub/Gown Entry Alcove (optional): 1 @ 5.6 (60) = _____

B. Clean Workroom/Charting Area: _____ normal and special care bassinets @ 0.28 (3) = 3.7 (40) min.

C. Soiled Holding: _____ total bassinets @ 0.28 (3) = 3.7 (40) min.

D. Equipment Storage Alcove: _____ total bassinets @ 0.28 (3) = 3.7 (40) min.

NSM (NSF)

E. Formula Room (optional): 1 @ 5.6 (60) plus 0.93 (1) per total bassinets = _____

F. Feeding Room (optional): 1 @ 9.3 (100) = _____

G. Janitor Closet: 1 @ 3.7 (40) = _____

H. Other (itemize):

_____ = _____

_____ = _____

I. Subtotal Support Areas (add Lines 2A through 2H) = _____

3. ADMINISTRATIVE AREAS

A. Head Nurse Office (optional):

_____	Private office @ 11.2 (120)	=	
_____	Open work station @ 5.6 (60)	=	
_____	TOTAL		= _____

B. Secretarial/Clerical work area (optional):

_____	Private office @ 9.3 (100)	=	
_____	Open work station @ 5.6 (60)	=	
_____	Seats for waiting/reception @ 1.4 (15)	=	
_____	Files @ 0.56 (6)	=	
_____	TOTAL		= _____

C. Staff Lounge (optional):

_____ Maximum seating capacity @ 1.4 (15) = _____

9.3 (100) min.

NSM (NSF)

D. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	= 1.4 (15)	
_____	Water closet(s) @ 1.4 (15)	= _____	
_____	Lavatory(s) @ 1.4 (15)	= _____	
_____	Urinal(s) @ 1.4 (15)	= _____	
_____	TOTAL		= 4.2 (45) min.

E. Male Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	= _____	
_____	Lockers (half length) @ 0.47 (5)	= _____	
_____	Lockers (box/purse) @ 0.28 (3)	= _____	
_____	TOTAL		= 5.6 (60) min.

F. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	= 1.4 (15)	
_____	Water closet(s) @ 1.4 (15)	= _____	
_____	Lavatory(s) @ 1.4 (15)	= _____	
_____	TOTAL		= 4.2 (45) min.

G. Female Staff Lockers/Changing Room (optional):

_____	Lockers (full length) @ 0.74 (8)	= _____	
_____	Lockers (half length) @ 0.47 (5)	= _____	
_____	Lockers (box/purse) @ 0.28 (3)	= _____	
_____	TOTAL		= 5.6 (60) min.

H. Conference Room (optional):

_____	Maximum seating capacity @ 1.4 (15)	= 9.3 (100) min.

I. Other (itemize):

_____	= _____
_____	= _____

J. Subtotal Administrative Areas (add Lines 3A through 3I) = _____

4. SUMMARY

		NSM (NSF)
A. Total Primary Activity Areas (Line 1D)	=	
B. Total Support Areas (Line 2I)	=	
C. Total Administrative Areas (Line 3J)	=	
D. Total NSM (NSF)	=	
	x 1.45	
E. Total GSM (GSF)	=	

APPENDIX D
EXAMPLE OF COMPLETED METHODOLOGY FORMS

FORM 1
REFERENCE SHEET

This reference sheet is to serve as a convenient means for accumulating and maintaining project background information. Projects will occasionally extend over longer periods of time than anticipated, in which case, the bases for early assumptions and calculations may be lost or forgotten. documenting relevant information on these sheets will avoid such problems. Back-up calculations should also be maintained.

1.0 ESTIMATE OF TOTAL MEDICAL/SURGICAL BED NEED:

- The Total Medical/Surgical bed requirement is: 240

  The year as the planning horizon is 1986

  The approaches utilized to determine bed need were:

  DOCUMENTED IN HOSPITAL'S LONG-RANGE PLAN.

- The number of medical/surgical nursing units programmed are as follows:

UNIT	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	METHOD OF DELIVERY OF CARE*
N-1	"A" BLDG.	1	40	PRIMARY CARE
S-1	"	1	40	"
N-2	"	2	40	"
S-2	"	2	40	"
N-3	"	3	40	"
S-3	"	3	40	"

*As in functional, team, primary, modular or some combination of these methodologies.

2.0 ESTIMATE OF TOTAL PEDIATRIC BED NEED (if justified):

- The Pediatric bed requirement is: [0]
  The year used as the planning horizon is 19____.
  The approach utilized to determine bed need was:

_____

_____

_____

- The number of pediatric nursing units programmed are as follows:

UNIT REFERENCE	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	UNIT ORGANIZATION

3.0 ESTIMATE OF PSYCHIATRIC BED NEED (if justified):

- The Psychiatric bed requirement is: [0]
  The year used as the planning horizon is 19____.
  The approach utilized to determine bed need was:

_____

_____

_____

- The number of psychiatric nursing units programmed are as follows:

UNIT REFERENCE	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	UNIT ORGANIZATION

4.0 ESTIMATE OF OBSTETRICAL BED NEED (if justified):

22

- The Obstetrical bed requirement is:
  The year used as the planning horizon is 19 86
  The approach utilized to determine bed need was:
  DOCUMENTED IN HOSPITAL'S LONG-RANGE PLAN.

- The number of obstetrical nursing units programmed are as follows:

UNIT REFERENCE	BUILDING	FLOOR LEVEL	NUMBER OF BEDS	UNIT ORGANIZATION
OB-3	"B" BLDG.	3	22	TEAM

5.0 ESTIMATE OF NEWBORN NURSERY BASSINETS:

- The Newborn Nursery bassinet requirement is: 16

The year used as the planning horizon is 1986.

The approach utilized to determine bed need was:

BASED ON AVERAGE DAILY CENSUS IN POST-PARTUM UNIT.

6.0 ASSUMPTIONS UPON WHICH INPATIENT BED NEED WAS BASED WERE:

- ALL NEW MED./SURG. UNITS WILL USE "NO NURSING STATION" CONCEPT AND "NURSERVERS" IN PATIENT ROOMS.
- OB NURSING UNIT WILL HAVE CONVENTIONAL NURSING STATIONS.

7.0 QUALIFIERS TO IDENTIFIED ASSUMPTIONS IN PLANNING INPATIENT NURSING UNIT(S) AND NEWBORN NURSERIES INCLUDE THE FOLLOWING:

FORM 2
PRELIMINARY SPACE ESTIMATE

1. MEDICAL/SURGICAL NURSING UNITS

Total medical/surgical bed need	= 240 beds	= 240 beds
☑ All private rooms	x 32.6 (350)	x 39.5 (425)
	or	or
☐ Private and semiprivate rooms	x 30.2 (325)	x 34.9 (375)
	or	or
☐ Mostly semiprivate or multiple bed rooms	x 25.6 (275)	x 32.6 (350)
Total Medical/Surgical Nursing Unit FGSM (FGSF)*	= 7,824 (84,000)	= 9,480 (102,000)

2. PEDIATRIC NURSING UNITS

Total pediatric bed need	= _____ beds	= _____ beds
☐ All private rooms	x 32.6 (350)	x 39.5 (425)
	or	or
☐ Private and semiprivate rooms	x 30.2 (325)	x 34.9 (375)
	or	or
☐ Mostly semiprivate or multiple bed rooms	x 25.6 (275)	x 32.6 (350)
Total Pediatric Nursing Unit FGSM (FGSF)*	= —	= —

*Floor gross square meters (floor gross square feet). See Appendix E for further explanation.

3. PSYCHIATRIC NURSING UNITS

Total psychiatric bed need	= _____ beds	= _____ beds
☐ All private rooms	x 41.9 (450)	x 55.8 (600)
☐ Private and semiprivate rooms	or x 39.5 (425)	or x 53.5 (575)
☐ Mostly semiprivate or multiple bed rooms	or x 34.9 (375)	or x 51.2 (550)
Total Psychiatric Nursing Unit FGSM (FGSF)*	= [—] TO	= [—]

4. OBSTETRICAL NURSING UNITS

Total obstetrical bed need	= 22 beds	= 22 beds
☐ All private rooms	x 32.6 (350)	x 39.5 (425)
☑ Private and semiprivate rooms	or x 30.2 (325)	or x 34.9 (375)
☐ Mostly semiprivate or multiple bed rooms	or x 25.6 (275)	or x 32.6 (350)
Total Obstetrical Nursing Unit FGSM (FGSF)*	= [717 (7,700)] TO	= [768 (8,250)]

5. NEWBORN NURSERIES

Total newborn nursery bassinets projected	= 16	= 16
	x 7.0 (75)	x 11.2 (120)
Total Newborn Nursery GSM (GSF)	= [112 (1,200)] TO	= [179 (1,920)]

NOTE: A minimum of 55.8 (600) should be programmed for a newborn nursery (maximum of four bassinets).

*Floor gross square meters (floor gross square feet). See Appendix E for further explanation.

FORM 3A
DETAILED SPACE CALCULATIONS
(MEDICAL/SURGICAL NURSING UNITS)

SPACE PROGRAM FOR "N-1" (40 BEDS)

1. PRIMARY ACTIVITY AREAS

		NSM (NSF)
A.	Patient Rooms:	
[30]	Private patient rooms @ 14.0 (150)	= 532.0 (5,700)
[30]	Toilets @ 3.7 (40)	= 140.6 (1,520)
[ ]	Showers (optional) @ 1.9 (20)	=
[30]	Nurse work alcove (optional) @ 3.7 (40)	= 140.6 (1,520)
[30]	Nurserver/patient supply storage cabinet (optional) @ 0.93 (10)	= 35.3 (380)
[ ]	Semiprivate patient rooms @ 21.4 (230)	=
[ ]	Toilets @ 3.7 (40)	=
[ ]	Showers (optional) @ 1.9 (20)	=
[ ]	Nurse work alcove (optional) @ 3.7 (40)	=
[ ]	Nurserver/patient supply storage cabinet (optional) @ 0.93 (10)	=
[2]	Isolation rooms @ 14.0 (150)	= 28.0 (300)
[2]	Toilets @ 3.7 (40)	= 7.4 (80)
[2]	Anterooms @ 3.7 (40)	= 7.4 (80)
[ ]	Showers (optional) @ 1.9 (20)	=
[2]	Nurserver/patient supply storage cabinet (optional) @ 0.93 (10)	= 1.9 (20)
B.	Exam/Treatment Room (optional): 1 @ 14.0 (150)	=
C.	Subtotal Primary Activity Areas (Add Lines 1A and 1B)	= 893.2 (9,600)

2. SUPPORT AREAS

NSM (NSF)

A. Clean Supply Holding Room: 40 beds @ 0.47 (5) = 18.8(200) LESS 20% = 15.0 (160)
11.2 (120) min.
18.6 (200) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets, reduce clean supply room space by 20%. The programmed clean supply space for various nursing units on the same floor level may then be combined into a central area.

B. Soiled Holding Room: 40 beds @ 0.23 (2.5) = 9.3(100) LESS 20% = 7.4 (80)
7.4 (80) min.
9.3 (100) max.

Note: If patient rooms will have built-in nurservers/patient supply storage cabinets reduce soiled holding room space by 20%. The programmed soiled holding space for various nursing units on the same floor level may then be combined into a central area.

C. Medication Center: 1 @ 4.7 (50) = 4.7 (50)

Note: If a self-contained medicine dispensing unit is located at the nursing station, omit this space and increase the programmed nursing station space by 2.8 (30).

D. Nourishment Center: 1 @ 5.6 (60) = 5.6 (60)

E. Equipment Storage: 40 beds @ 0.23 (2.5) minimum = 9.3 (100)

Note: Equipment storage varies with the type of patients on the unit (e.g., orthopedic patients require traction equipment).

F. Stretcher/Wheelchair Alcove: 2 @ 2.2 (24) = 4.4 (48)

G. Patient/Visitor Lounge: 40 beds @ 1.4 (15) = 56.0 (600)

Note: Add 14.0 (150) if this is the only patient/visitor lounge on the floor.

H. Emergency Equipment Holding: 1 @ 1.9 (20) = 1.9 (20)

Note: Should be contiguous with the nursing station.

NSM (NSF)

I. Patient Bath/Shower: one bathtub or shower per 12 beds @ 2.8 (30) = 11.2 (120)

Note: If bathtubs or showers are combined with a patient toilet (i.e., lavatory and water closet), reduce space per bathtub or shower to 1.9 (20). If patient rooms are provided with contiguous bathtubs or showers, provide only one shared bathtub and one shower per nursing unit.

J. Patient Sitz Bath (optional): _____ @ 2.8 (30) = _____

K. Janitor Closet: 1 @ 3.7 (40) = 3.7 (40)

L. Other (itemize):

_____ = _____

_____ = _____

M. Subtotal Support Areas (add Lines 2A through 2L) = 119.2 (1,278)

3. ADMINISTRATIVE AREAS

A. Nursing Station (optional): _____ beds @ 0.47 (5) = _____

B. Administrative Control Center (optional): _____ beds @ 0.28 (3) = _____

Note: Combine the space programmed above with other nursing units on the same floor level into one central area.

NSM (NSF)

C. Team Conference Center (optional): 1 @ 9.3 (100) PROVIDE (1) T.C.C. PER 20 BEDS (TWO TEAMS) = 9.3 (100)

D. Physician Dictation (optional): 2 booths @ 1.4 (15) = 2.8 (30)

E. Head Nurse Office (optional):

1	Private office @ 11.2 (120)	= 11.2 (120)	
____	Open work station @ 5.6 (60)	= ____	
____	TOTAL		= 11.2 (120)

F. Secretarial/Clerical Work Area (optional):

____	Private office @ 9.3 (100)	= ____	
____	Open work station @ 5.6 (60)	= ____	
____	Seats for waiting/reception @ 1.4 (15)	= ____	
____	Files @ 0.56 (6)	= ____	
____	TOTAL		= —

G. Staff Lounge (optional):

6	Maximum seating capacity @ 1.4 (15)	= 9.3 (100)
		9.3 (100) min.

H. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	= 1.4 (15)	
1	Water closet(s) @ 1.4 (15)	= 1.4 (15)	
1	Lavatory(s) @ 1.4 (15)	= 1.4 (15)	
____	Urinal(s) @ 1.4 (15)	= ____	
____	TOTAL		= 4.2 (45)
			4.2 (45) min.

I. Male Staff Lockers/Changing Room (optional): SHARED

____	Lockers (full length) @ 0.74 (8)	= ____	
____	Lockers (half length) @ 0.47 (5)	= ____	
____	Lockers (box/purse) @ 0.28 (3)	= ____	
____	TOTAL		= —
			5.6 (60) min.

NSM (NSF)

J. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	= 1.4 (15)	
1	Water closet(s) @ 1.4 (15)	= 1.4 (15)	
1	Lavatory(s) @ 1.4 (15)	= 1.4 (15)	
	TOTAL		= 4.2 (45)
			4.2 (45) min.

K. Female Staff Lockers/Changing Room (optional): SHARED

____	Lockers (full length) @ 0.74 (8)	= ____	
____	Lockers (half length) @ 0.47 (5)	= ____	
____	Lockers (box/purse) @ 0.28 (3)	= ____	
	TOTAL	____	= ____
			5.6 (60) min.

L. Conference Room (optional):

____	Maximum seating capacity @ 1.4 (15)	= ____
		9.3 (100) min.

M. Other (itemize):

_____	= _____
_____	= _____

N. Subtotal Administrative Areas (add Lines 3A through 3M) = 41.0 (440)

4. SUMMARY

		NSM (NSF)
A.	Total Primary Activity Areas (Line 1C)	= 893.2 (9,600)
B.	Total Support Areas (Line 2M)	= 119.2 (1,278)
C.	Total Administrative Areas (Line 3N)	= 41.0 (440)
D.	Total NSM (NSF)	= 1,053.4 (11,318)
		x 1.55
E.	Total FGSM (FGSF)	= 1,633 (17,540)

FORM 3E
DETAILED SPACE CALCULATIONS (NEWBORN NURSERIES)

1. PRIMARY ACTIVITY AREAS

NSM (NSF)

A. Newborn Nurseries:

[12] Normal newborn bassinets @ 2.2 (24) = 26.4 (288) / 11.2 (120) min.

B. Special Care Nursery (optional):

[4] Special care bassinets @ 3.7 (40) = 14.8 (160) / 9.3 (100) min.

C. Exam/Treatment Area: 16 normal and special care bassinets @ 0.28 (3) = 4.5 (48)

D. Subtotal Primary Activity Areas (add Lines 1A through 1C) = 45.7 (496

1. SUPPORT AREAS

A. Scrub/Gown Entry Alcove (optional): 1 @ 5.6 (60) = 5.6 (60)

B. Clean Workroom/Charting Area: 16 normal and special care bassinets @ 0.28 (3) = 4.5 (48) / 3.7 (40) min.

C. Soiled Holding: 16 total bassinets @ 0.28 (3) = 4.5 (48) / 3.7 (40) min.

D. Equipment Storage Alcove: 16 total bassinets @ 0.28 (3) = 4.5 (48) / 3.7 (40) min.

NSM (NSF)

E. Formula Room (optional): 1 @ 5.6 (60) plus 0.93 (1) per total bassinets = _____

F. Feeding Room (optional): 1 @ 9.3 (100) = 9.3 (100)

G. Janitor Closet: 1 @ 3.7 (40) = 3.7 (40)

H. Other (itemize):

_____ = _____

_____ = _____

I. Subtotal Support Areas (add Lines 2A through 2H) = 32.1 (344)

3. ADMINISTRATIVE AREAS

A. Head Nurse Office (optional):

1	Private office @ 11.2 (120)	= 11.2 (120)	
____	Open work station @ 5.6 (60)	= _____	
____	TOTAL		= 11.2 (120)

B. Secretarial/Clerical work area (optional):

____	Private office @ 9.3 (100)	= _____	
____	Open work station @ 5.6 (60)	= _____	
____	Seats for waiting/reception @ 1.4 (15)	= _____	
____	Files @ 0.56 (6)	= _____	
____	TOTAL		= _____

C. Staff Lounge (optional):

____	Maximum seating capacity @ 1.4 (15)	= 9.3 (100) min.

NSM (NSF)

D. Male Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	= 1.4 (15)	
____	Water closet(s) @ 1.4 (15)	= ____	
____	Lavatory(s) @ 1.4 (15)	= ____	
____	Urinal(s) @ 1.4 (15)	= ____	
____	TOTAL		= 4.2 (45) min.

E. Male Staff Lockers/Changing Room (optional):

____	Lockers (full length) @ 0.74 (8)	= ____	
____	Lockers (half length) @ 0.47 (5)	= ____	
____	Lockers (box/purse) @ 0.28 (3)	= ____	
____	TOTAL		= 5.6 (60) min.

F. Female Staff Toilet (optional):

1	Vestibule @ 1.4 (15)	= 1.4 (15)	
1	Water closet(s) @ 1.4 (15)	= 1.4 (15)	
1	Lavatory(s) @ 1.4 (15)	= 1.4 (15)	
____	TOTAL		= 4.2 (45) 4.2 (45) min.

G. Female Staff Lockers/Changing Room (optional):

____	Lockers (full length) @ 0.74 (8)	= ____	
____	Lockers (half length) @ 0.47 (5)	= ____	
____	Lockers (box/purse) @ 0.28 (3)	= ____	
____	TOTAL		= 5.6 (60) min.

H. Conference Room (optional):

____	Maximum seating capacity @ 1.4 (15)	= 9.3 (100) min.

I. Other (itemize):

_____	= _____
_____	= _____

J. Subtotal Administrative Areas (add Lines 3A through 3I) = 15.4 (165)

4. SUMMARY

		NSM (NSF)
A.	Total Primary Activity Areas (Line 1D)	= 45.7 (496)
B.	Total Support Areas (Line 2I)	= 32.1 (344)
C.	Total Administrative Areas (Line 3J)	= 15.4 (165)
D.	Total NSM (NSF)	= 93.2 (1,005)
		x 1.45
E.	Total GSM (GSF)	= 135 (1460)

APPENDIX E
METHODS OF HOSPITAL SPACE CALCULATION

APPLICATION OF DEPARTMENTAL NET TO GROSS CONVERSION FACTORS

The primary purpose of the net to gross factors is to assist in the preparation of building cost estimates and to translate programmed requirements into meaningful architectural block schematic drawings.

The following explanation will describe procedures utilizing the net to gross conversion factors for converting programmed net areas to gross areas for block schematics.

NET TO GROSS CONVERSION FACTORS

The net to gross factor is the conversion factor which, when multiplied times the net area, yields the total "departmental" gross area including circulation, structure, partitions, and mechanical areas within the department.

(Net to Gross factor) (Department Net Area) = Departmental Gross Area

Example:

The programmed net area for anesthesiology is 600 NSF and the net to gross conversion factor for anesthesiology is 1.44.

Therefore:

(1.44) (600 NSF) = 864 Departmental Gross Square Feet (DGSF)

FLOOR GROSS CONVERSION FACTOR

The "departmental" net to gross conversion factors (with the exception of inpatient nursing units) determine the gross area of only the department, itself, and do not include the gross area requirements for interdepartmental circulation (such as public corridors, elevators, and stairs) and certain other "non-departmental" space requirements for the functioning of the total building. To obtain this "floor

gross" area, another conversion factor must be applied to the sum of departmental gross areas on that floor. For hospitals, this conversion factor is approximately 1.25.

(Sum of Departmental Gross Areas)(1.25) = Total Floor Gross Square Feet (FGSF)

For the special case of inpatient nursing units, the "departmental" net to gross factor also represents the total "floor gross" area required for the nursing floors.

BUILDING GROSS CONVERSION FACTOR

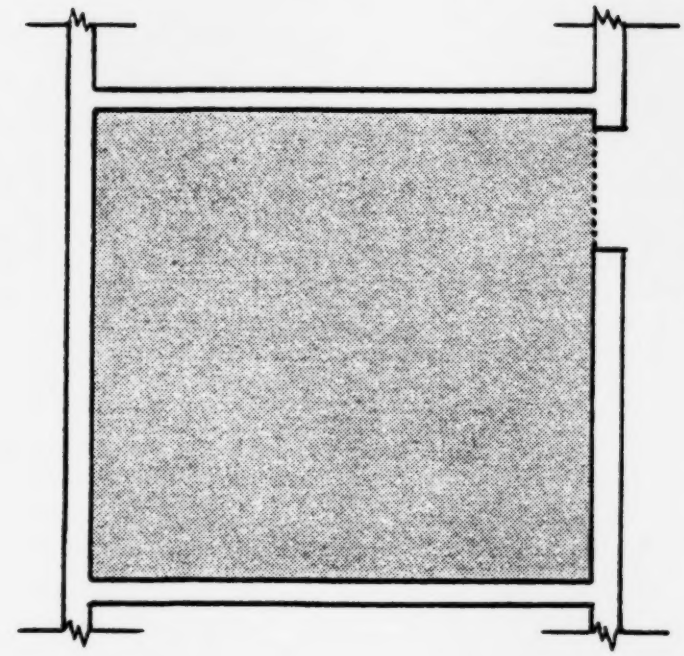
Gross space requirements for air handling equipment are arrived at by adding to the sum of all floor gross areas another 6% to 10%. That is, to obtain a total "building gross" area which includes air handling equipment, a conversion factor of approximately 1.08 (8%) should be applied to the total "floor gross" areas.

A general overall factor can also be used to obtain the gross area for the entire hospital based on the sum of all net areas, such as:

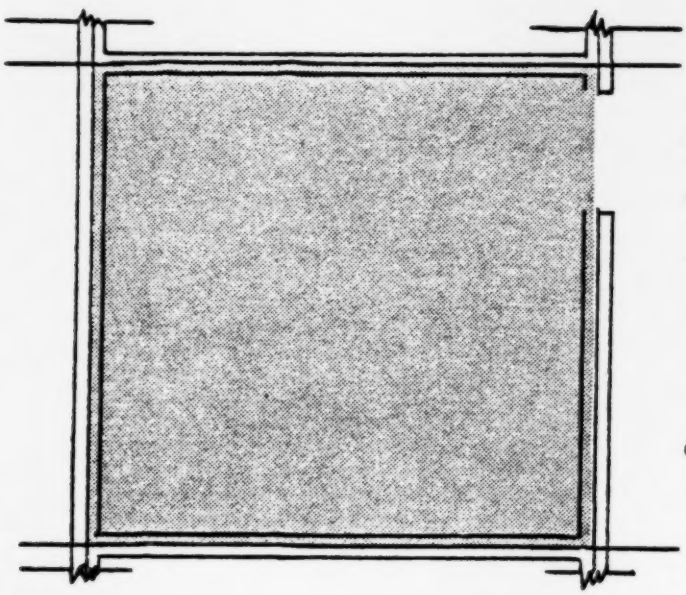
(Sum of Department Net Areas)(1.70) = Total Building Gross Square Feet (BGSF)

If a heating/cooling plant is to be part of the project, the gross area requirements for this can be estimated at approximately 2 1/2% of the sum of total "floor gross" areas.

SINGLE ROOM NET TO GROSS EXAMPLE



- Net programmed room area is inside wall to wall dimensions
- 160 Net Square Feet (NSF)



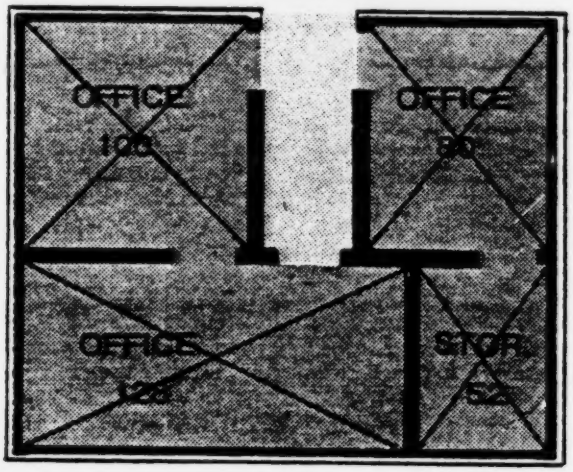
- Gross room area is taken to centerline of wall
- 173 Gross Square Feet (GSF)
- Which includes:

  13 Square feet partition area

  160 Square feet net programmed area

- Therefore: Net to Gross factor for this room would be 1.08

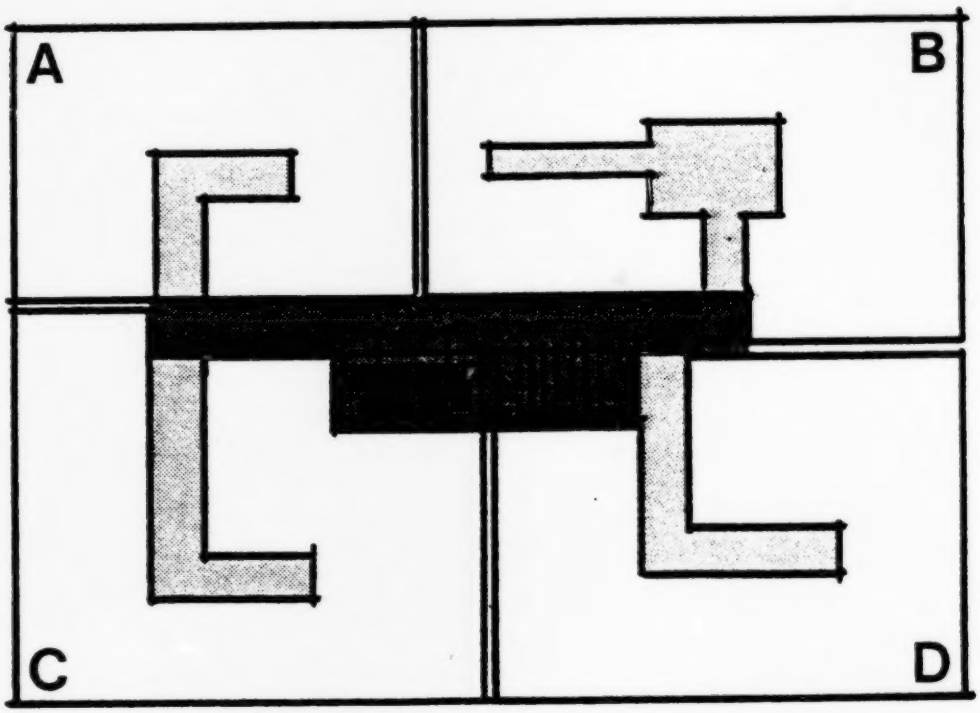
DEPARTMENTAL NET TO GROSS EXAMPLE



Office	= 100 NSF
Office	= 80 NSF
Office	= 128 NSF
Storage	= 52 NSF

- Total Net (Programmed) Department Area = 360 NSF
- Net to Gross Factor for this department is 1.24
- Therefore: (360)(1.24) = 446 DGSF
- Which includes:
  - 40 Square feet circulation
  - 46 Square feet partition
  - 360 Square feet net programmed area

COMPLETE FLOOR NET TO GROSS EXAMPLE



Department A Gross Area = 1,200 DGSF
Department B Gross Area = 1,850 DGSF
Department C Gross Area = 2,000 DGSF
Department D Gross Area = 1,600 DGSF

Combined Departmental Gross Area = 6,650 DGSF

- Floor Net to Gross Conversion Factor is 1.25
- Therefore: (6,650)(1.25) = 8,312 FGSF
- Which includes:
  - General circulation
  - Partitions
  - Structure
  - Combined departmental gross area

GLOSSARY

AMBULATORY CARE UNIT	The hospital unit specifically designed, staffed, and equipped to provide diagnostic and therapeutic services to outpatients. These units may include day or night care, emergency, and the outpatient unit. Services provided in such units may be of a scheduled or unscheduled nature.
BURN UNIT	The hospital unit specifically designed, staffed, and equipped to treat critically burned patients according to a consistent management program directed by a full-time experienced physician.
CORONARY CARE UNIT	The hospital unit specifically designed, staffed and equipped with essential diagnostic, monitoring, and therapeutic equipment operated under adequate medical supervision to provide constant, close observation of acute coronary patients, definite or suspect.
DELIVERY	Expulsion or extraction of the child at birth.
DEPARTMENTAL GROSS AREA	The total floor area allocated to a department, measured as the area encompassed by the walls or partitions at the periphery of that department (center line to center line dimensions). Interdepartmental circulation (i.e., circulation serving more than one department), stairwells, elevators, and shafts are excluded. Spaces shared by more than one department (i.e., waiting rooms) are assigned to each department in proportion to their respective use of the space.
DEPARTMENTAL NET AREA	The sum of all net spaces in a department.
EQUIPMENT	Implements used in an operation or activity to serve a health purpose. The definition in the context of health planning is generally limited to large, expensive, or highly specialized health care equipment. Much of this equipment is not movable.

FACILITY	The physical building in which an institution operates.
FUNCTION	Set of activities necessary to carry out a definable mission over an extended period of time.
FUNCTIONAL NURSING	A system of patient care based upon the division of labor according to tasks and routines; selected functions are assigned to all personnel with no one person being responsible for each patient's direct nursing care.
FUNCTIONAL PROGRAM	A description of activities, processes, people, and equipment necessary to perform a service at a projected workload level. Functional programs are usually organized to describe departments in medical institutions.
FUNCTIONAL PROGRAMMING	The process by which an identified service program and defined level of patient utilization or workload is evaluated to determine the most desirable method of fulfilling medical program objectives.
GSM (GSF)	Gross square meters (gross square feet).
GUIDELINES	Guiding information or recommended procedures. Priorities, standards, goals, and objectives may be added to guidelines.
HEALTH CARE NEEDS	A condition requiring a supply of relief, usually expressed as that quantity of health services required for diagnosis of disorders and achievement of positive improvement or maintenance of health status. That quantity of health services required for the diagnosis of diseases in a given population and the medical services required to achieve a positive improvement or maintenance of health status during a given period of time. It focuses on conditions requiring medical service and splits it into a two-step process: identification of conditions and identification of the medical service equivalents of those conditions.

INTRAPARTUM PERIOD	The period of gestation from the onset of labor to the end of labor.
LABOR	The physiologic process by which the uterus expels, or attempts to expel, the fetus and placenta at 20 weeks or more of gestation.
LIFE-CYCLE COST	The total cost of providing, maintaining, and operating a facility, system, component, or item of equipment over its expendable life.
MEDICAL INTENSIVE CARE UNIT	The hospital unit specifically designed, staffed, and equipped with essential diagnostic, monitoring, and therapeutic equipment operated under adequate physician supervision to provide constant, close observation of patients who are critically ill due to a medical problem.
MEDICAL NURSING UNIT	A unit specifically designed, staffed, and equipped to provide nursing care to patients undergoing medical diagnostic, therapeutic, and rehabilitative regimens.
METHODOLOGY	A technique for analyzing a process and developing procedures and methods for its application.
MODULAR NURSING	A system of patient care that is a compromise between primary nursing and team nursing; a nursing unit is divided into modules (or bed groupings) with a professional nurse assigned to the same patients every day, with responsibility for implementing the nursing process and coordinating other nursing personnel.
NEONATAL PERIOD	That part of an infant's life from the hour of birth through the first 28 days of life.
NET AREA (SQUARE METER/ FEET)	The actual usable space within a room or area (inside wall-to-wall dimensions or to lines of functional separation).
NSM (NSF)	Net square meters (net square feet).

NEWBORN NURSERY	The hospital unit specifically designed, staffed, and equipped to provide nursing care to newborn infants during the post-natal period. Nursing care includes assessment and observation, sustainative care (i.e., feeding and bathing) and minimal therapeutic intervention.
OBSTETRICS	A branch of medicine that deals with birth and with its antecedents and sequels.
OBSTETRIC NURSING UNIT	A unit specifically designed, staffed, and equipped to provide nursing care to patients during the post-partum period as well as antinatal patients whose condition warrants close observation and/or therapeutic intervention.
OUTPATIENT CARE	Ambulatory care excluding day care, night care, and emergency services.
PEDIATRIC NURSING UNIT	The hospital unit specifically designed, staffed, and equipped to provide nursing care to children, newborn through age 18, who are undergoing medical and/or surgical interventions for diagnostic, therapeutic, or rehabilitative purposes.
PERINATAL	Pertaining to or occurring in the period shortly before and after birth.
PERINATAL INTENSIVE CARE UNIT	The hospital unit specifically designed, staffed, and equipped to provide perinatal and neonatal care facilities in geographical continuity, operationally integrated and located in a perinatal health center, for patients (mothers and infants) requiring specialized care.
PLANNING HORIZON	That point in the future at which the plan is focused.
POST-PARTUM PERIOD	A general term referring to the period of time following completion of the final stage of labor.
PRENATAL PERIOD	The period of gestation from conception to the beginning of the birth process.

PRIMARY NURSING	A system of patient care in which one professional nurse assumes full (24-hour-a day) accountability for a small caseload of patients from their admission to discharge; the focus is on a one-to-one relationship between the nurse and the patient and his/her family with the care of the patient delegated to a secondary nurse on other shifts.
PROCESS	A series of actions, changes, or functions that bring about an end result.
PSYCHIATRIC NURSING UNIT	The hospital unit specifically designed, staffed, and equipped to provide a therapeutic environment for patients diagnosed as having psychiatric illnesses. The treatment program includes the services of the psychiatric medical staff, specialized nursing staff, and professionally recognized interdisciplinary personnel (e.g., psychology, social services, activity therapy).
RESPIRATORY INTENSIVE CARE UNIT	The hospital unit specifically designed, staffed, and equipped to provide constant, close observation of acute respiratory patients.
RESPIRATORY TECHNOLOGY	The hospital unit specifically designed and staffed for the administration of various gases and aerosols in the treatment of respiratory conditions of patients and for the maintenance and repair of respiratory therapy and associated equipment.
SERVICE AREA	The geographic area in which all or a majority of an institution's clientele reside. This may be a special planning area defined by law and is not necessarily related to market areas or other considerations. The service community may be only a part of the total communty if other providers provide similar services in the same area. (American Medical Association, 1973)
SERVICE AREA CHARACTERISTICS	The description of the service area in terms of its geography, socioeconomics, and demography.

SPECIAL CARE UNIT	A unit specifically designed, staffed, and equipped for the continuous observation and treatment of critically ill or post-operative patients. A special care unit may be subcategorized by the type of patient specifically treated (i.e., medical intensive care, surgical intensive care, coronary intensive care, respiratory intensive care, etc.).
STANDARD	The specific value of a criterion. Each planning or health systems performance criterion can have specific levels or standards established as acceptable or non-acceptable. For example, an 8.5% or greater bed occupancy of an inpatient facility may be considered acceptable.
SURGICAL NURSING UNIT	The hospital unit specifically designed, staffed, and equipped to provide nursing care to patients undergoing surgery for diagnostic, therapeutic, and rehabilitative purposes.
SYSTEMS APPROACH	An approach to problem solving which views each individual activity or decision making event in the context of an overall process so that all interrelationships can be identified and criteria established.
TEAM NURSING	A system of patient care in which a nurse (usually a Registered Nurse) serves as team leader for a group of personnel who work together to provide care to assigned patients; the care of the patient is seen as a group task seeking the best individual and combined efforts of team members.

REFERENCES

American Association of Critical Care Nurses. Adler, Diane C. and Shoemaker, Norma J., eds. AACN Organization and Management of Critical-Care Facilities. St. Louis, Missouri: The C. V. Mosby Company, 1979.

Allen, Rex W. and von Karolyi, Ilona. Hospital Planning Handbook. New York: John Wiley & Sons, Inc., 1976.

Canadian Hospital Association. Canadian Hospital Terminology and Definitions. Ottawa, Ontario: Canadian Hospital Association, 1979.

Chapman, Robert H., Coffey, Richard J., and Peltzie, Kenneth G. "A Generic Process for Planning Health Services." American Journal of Health Planning, Vol. 2, No. 2, October, 1977.

Chi Systems, Inc. and Stone, Marraccini and Patterson. "Health Facility Planning and Development, Generic Planning Process, State Planning Procedures Manual." Ann Arbor, Michigan: Chi Systems, Inc., and Stone, Marraccini and Patterson, February, 1978.

Chi Systems, Inc. and Stone, Marraccini and Patterson. "Health Facility Planning and Development, Generic Planning Process, HSA Planning Procedures Manual." Ann Arbor, Michigan: Chi Systems, Inc., and Stone, Marraccini and Patterson, February, 1978.

Chi Systems, Inc. and Stone, Marraccini and Patterson. "Health Facility Planning and Development, Generic Planning Process, Institutional Planning Procedures Manual." Ann Arbor, Michigan: Chi Systems, Inc., and Stone, Marraccini and Patterson, February, 1978.

Chi Systems, Inc. and Stone, Marraccini and Patterson. "Health Facility Planning and Development, Generic Planning Process, Facility Programming and Development Manual." Ann Arbor, Michigan: Chi Systems, Inc. and Stone, Marraccini and Patterson, June, 1978.

Doyle, Owen. Analysis Manual for Hospital Information Systems. Washington, D.C.: Aupha Press, 1980.

Gangong, Joan and Gangong, Warren. Nursing Management. Rockville, Maryland: Aspen Systems Corporation, 1980.

Hayward-Pleitner, Cynthia. The Functional and Space Program: A Rational Opportunity for Cost Containment. Proceedings of the International Conference on Systems Science in Health Care. Montreal, Quebec: University of Montreal, 1980.

Health and Welfare. Cardiac Care Facilities and Services. Canada: Health Services and Promotions Branch, Health and Welfare, 1978.

Health and Welfare. Ottawa General Hospital - Evaluation of Proposed Concepts. Canada: Health and Welfare, 1975.

Health and Welfare. Recommended Standards for Maternity and Newborn Care. Canada: Health and Welfare, 1968.

Health and Welfare. Special Care Units in Hospitals. Canada: Health Programs Branch, Health and Welfare, 1976.

McLaughlin, Herbert. "How to Plan Efficient Patient Rooms." The Modern Hospital, Vol. 103, No. 4, October, 1964.

McLaughlin, Herbert. "What Shape is Best for Nursing Units?" The Modern Hospital, Vol. 103, No. 6, December, 1964.

Michigan Department of Public Health. Intensive Care Units: Minimal Criteria and Guidelines. Michigan: Bureau of Health Facilities, Michigan Department of Public Health, 1972.

Ministry of Health (Ontario). Planning Manual for Hospitals. Toronto: Institutional Planning Branch, Ministry of Health (Ontario), 1978.

Misericordia Hospital, "Nursing Services Information System," an unpublished paper by the Research and Development Department of the Misericordia Hospital, Edmonton, Alberta, Canada, 1975.

Riley, W. A. "The Double Corridor Plan Saves Steps and Promotes Efficiency." The Modern Hospital, Vol. 91, No. 2, August, 1968.

Ross Laboratories. Design for Obstetric and Pediatric Facilities. Columbus, Ohio: Ross Laboratories, 1972.

Rowland, Howard and Rowland, Beatrice. Nursing Administration Handbook. Rockville, Maryland: Aspen Systems Corporation, 1980.

Special Care Subcommittee. Guidelines for Minimum Standards for Special Care Areas in Hospitals. Nova Scotia: Nova Scotia Health Services and Insurance Commission, Nova Scotia, 1974.

U.S. Department of Health, Education, and Welfare, Public Health Service, Health Resources Administration, Division of Facilities Utilization. Minimum Requirements of Construction & Equipment for Hospital & Medical Facilities. Hyattsville, Maryland: USDHEW, PHS, HRA, 1979.

U.S. Veterans Administration, Department of Medicine and Surgery. Planning Criteria for VA Facilities, H-08-9. Washington, D.C.: U.S. Veterans Administration, 1977.

U.S. Veterans Administration, Department of Medicine and Surgery. Space Profile of Health Care Facilities. Washington, D.C.: U.S. Veterans Administration, November, 1972.

Wheeler, E. Todd. Hospital Design and Function. New York: McGraw Hill, 1964.

Wheeler, E. Todd. Hospital Modernization and Expansion. New York: McGraw Hill, 1971.